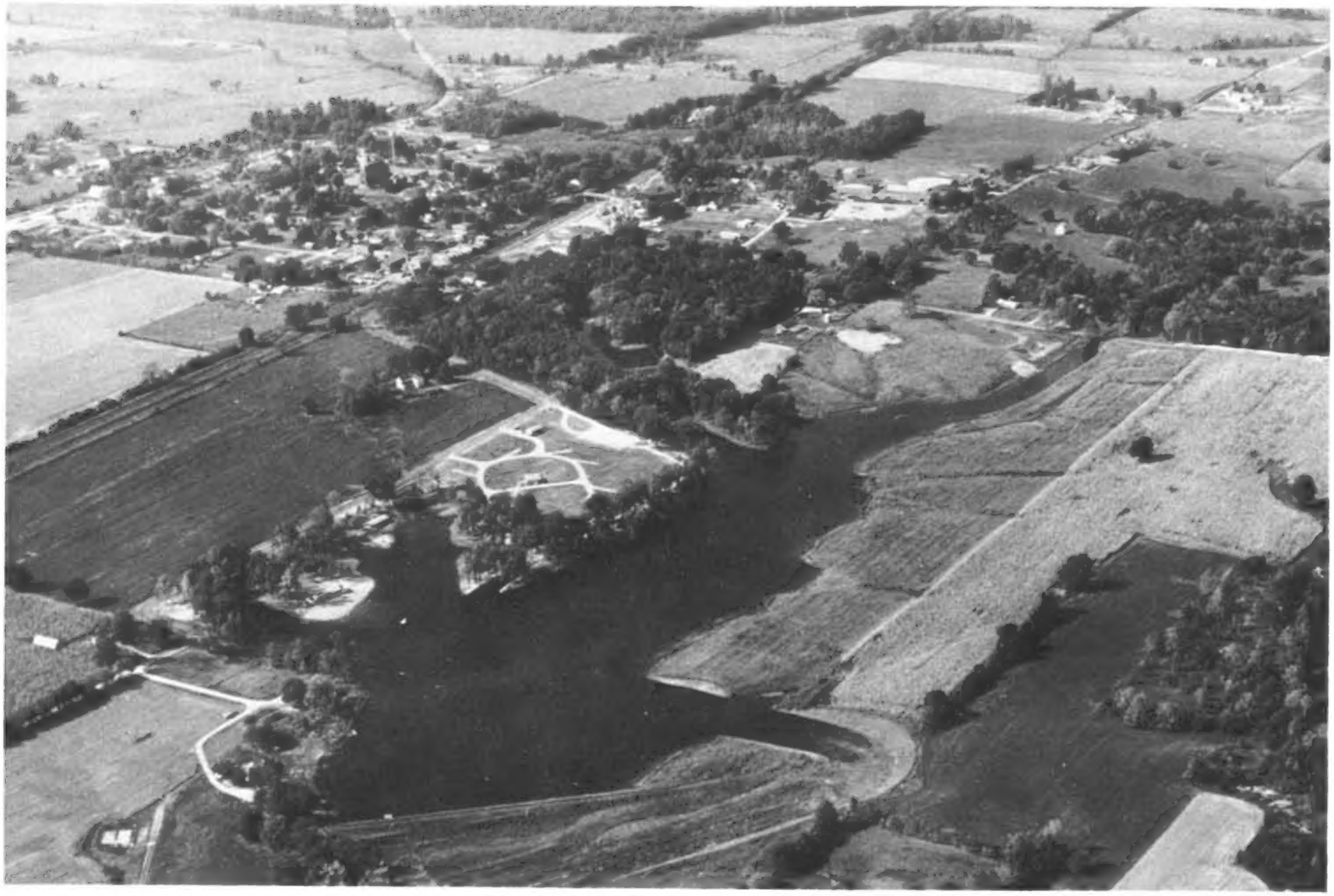
SOIL SURVEY OF

Daviess County, Indiana



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Purdue University
Agricultural Experiment Station

Issued September 1974

Major fieldwork for this soil survey was done in the period 1965–69. Soil names and descriptions were approved in 1969. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1969. This survey was made cooperatively by the Soil Conservation Service and the Purdue University Agricultural Experiment Station. It is part of the technical assistance furnished to the Daviess County Soil and Water Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Daviess County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the page for the capability unit in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units.

Foresters and others can refer to the section "Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Engineers and builders can find, under "Use of the Soils in Engineering," tables that contain estimates of soil properties and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Daviess County can refer to the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given in the section "General Nature of the County," at the back of the publication.

Cover: A lake on Cincinnati and Hosmer soils in the Prairie Creek Watershed. This lake was developed as part of a program of flood control. It is in the Montgomery Park recreation area.

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Contents

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SOIL SURVEY OF DAVIESS COUNTY, INDIANA

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

DAVIESS COUNTY is in the southwestern part of Indiana (fig. 1). It has a total of 277,120 acres, or 433 square miles. Washington, the county seat, is in the west-central part of the county. The climate is suitable for farming. Precipitation is ample, and the temperature is favorable. The physiography of the western part of the county is made up of broad terraces and bottom lands near the West Fork of the White River. The rest of the county, except for the steeply sloping soils in the northeastern, southeastern, and southern parts, is nearly level to moderately sloping and is on uplands. The county is drained by small streams that empty into the White River, and Prairie Creek is the largest of these.

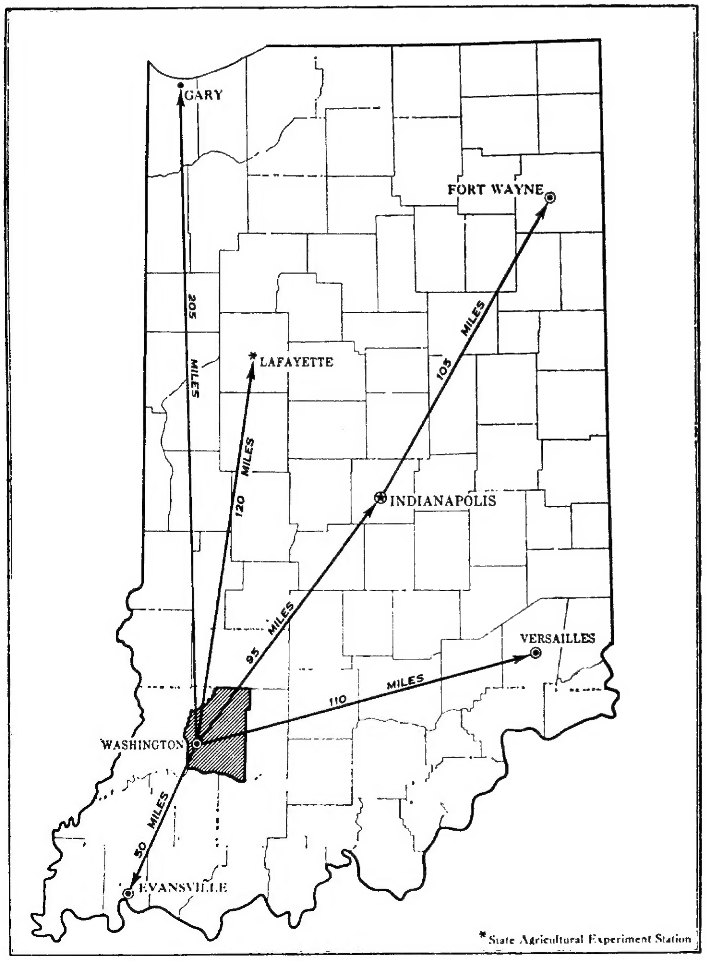

Figure 1.—Location of Daviess County in Indiana.

Farming is the main source of income in the county. Corn and soybeans are the main crops, and livestock is raised for meat and dairy products.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Daviess County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes; the size and speed of streams; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for a different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Vigo and Zipp, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Hosmer silt loam, 0 to 2 percent slopes, is one of several phases within the Hosmer series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map in the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. One such kind of mapping unit is shown on the soil map of Daviess County: a soil complex.

A soil complex consists of areas of two or more soils, so intermingled or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. An example is the Gilpin-Berks complex, 25 to 50 percent slopes.

In most areas surveyed are places where the soil material is so disturbed that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given a descriptive name. Strip mines is a land type in Daviess County.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others, and then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Daviess County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in this county are described in the following pages. The terms for texture used in the title for several of the associations apply to the surface layer. For example, in the title for association 1, the words "medium textured" refer to texture of the surface layer.

1. Hosmer-Cincinnati-Iva association

Deep, well-drained to somewhat poorly drained, medium-textured, nearly level to strongly sloping soils on uplands

This association is on uplands. It makes up about 39 percent of the county. About 39 percent of it is Hosmer soils, 22 percent is Cincinnati soils, and 14 percent is Iva soils. The rest is less extensive soils (fig. 2).

Hosmer soils are on the top and sides of ridges and are nearly level to strongly sloping. These soils formed in loess, 4 to 8 feet thick. They are well drained. The surface layer is brown silt loam, and the subsoil is mostly brown and yellowish-brown light silty clay loam. At a depth of about 30 inches is a very slowly permeable, firm and brittle fragipan that restricts the movement of roots and water.

Cincinnati soils are on the top and sides of ridges and are gently sloping to strongly sloping. These soils formed in 20 to 40 inches of loess and material weathered from till. They are well drained. The surface layer is grayish-brown silt loam, and the subsoil is yellowish-brown light silty clay loam. At a depth of about 30 inches is a very slowly permeable, firm and brittle fragipan that restricts the movements of roots and water.

Iva soils are on the top and sides of broad ridges. These soils are nearly level to gently sloping. They are poorly drained. The surface layer is grayish-brown silt loam, and the subsoil is mostly light brownish-gray light silty clay loam mottled with yellowish brown.

Among the less extensive soils in this association are the nearly level Vigo soils on uplands, the moderately steep to very steep Hickory soils on sides of drainageways. and the nearly level Stendal soils on bottom lands along small streams.

The soils in this association are used for corn, soybeans, small grain, pasture, and woods. Erosion is a hazard where the soils are sloping, and wetness is a limitation where the soils are poorly drained. A fragipan limits the root zone in some soils and reduces the available water capacity.

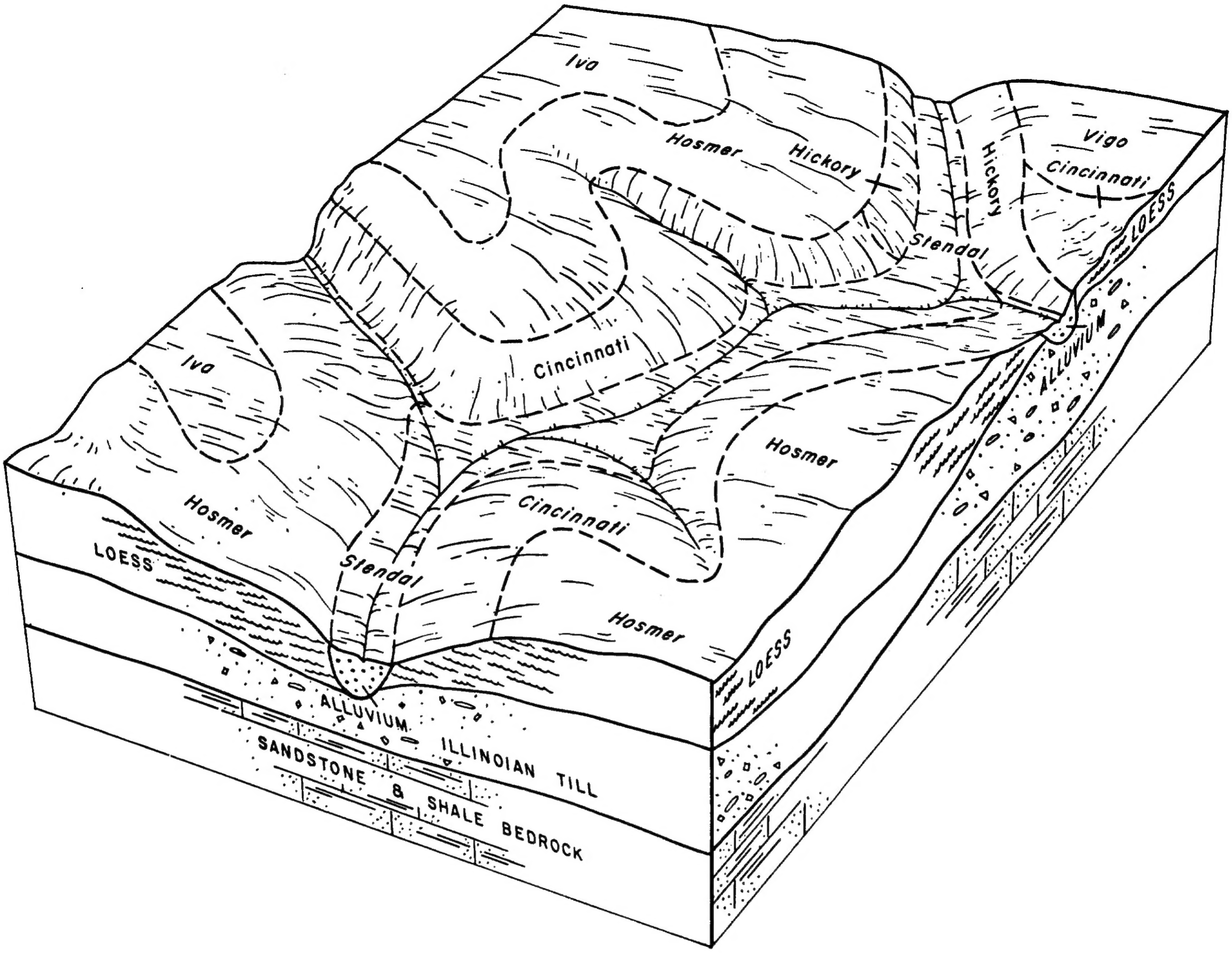

Figure 2.—**Parent material, position, and pattern of soils in the Hosmer-Cincinnati-Iva association.**

2. *Lyles-Ayrshire-Princeton association*

Deep, very poorly drained to well-drained, medium-textured and moderately coarse textured, nearly level to strongly sloping soils on uplands and terraces

This association is on uplands and terraces in the western part of the county. It makes up about 11 percent of the county. About 43 percent of it is Lyles soils, about 34 percent is Ayrshire soils, and about 11 percent is Princeton soils. The rest is less extensive soils (fig. 3).

Lyles soils are in depressions on uplands and terraces and are nearly level. These soils are very poorly drained. The surface layer is very dark brown loam and fine sandy loam, and the subsoil is mostly dark-gray, stratified sandy clay loam and sandy loam.

Ayrshire soils are on uplands and are nearly level. These soils are somewhat poorly drained. The surface layer is grayish-brown fine sandy loam, and the subsoil is mostly light brownish-gray and grayish-brown sandy clay loam mottled with brown.

Princeton soils are on uplands and are nearly level to strongly sloping. These soils are well drained. The surface layer is dark-brown fine sandy loam and the subsoil is brown sandy clay loam.

Among the less extensive soils in this association are gently sloping to steep Bloomfield soils on uplands, the nearly level Kings soils in depressions on uplands, and the nearly level Vincennes soils in depressions on terraces.

Wetness is a limitation where the soils are very poorly drained to somewhat poorly drained, and erosion is a hazard where the soils are gently sloping to very steep. Drought, which causes damage to crops, is a limitation on most sandy soils.

3. *Haymond-Nolin-Petrolia association*

Deep, well-drained to poorly drained, medium-textured and moderately fine textured, nearly level soils on bottom lands

This association is on bottom lands along the White River and small streams throughout the county. It makes up about 13 percent of the county. About 33 percent of it is Haymond soils, about 23 percent is Nolin soils, and about 17 percent is Petrolia soils. The rest is less extensive soils (fig. 4). These soils are neutral or slightly acid.

Haymond soils are well drained. The surface layer is dark-brown silt loam, and the subsoil is brown silt loam.

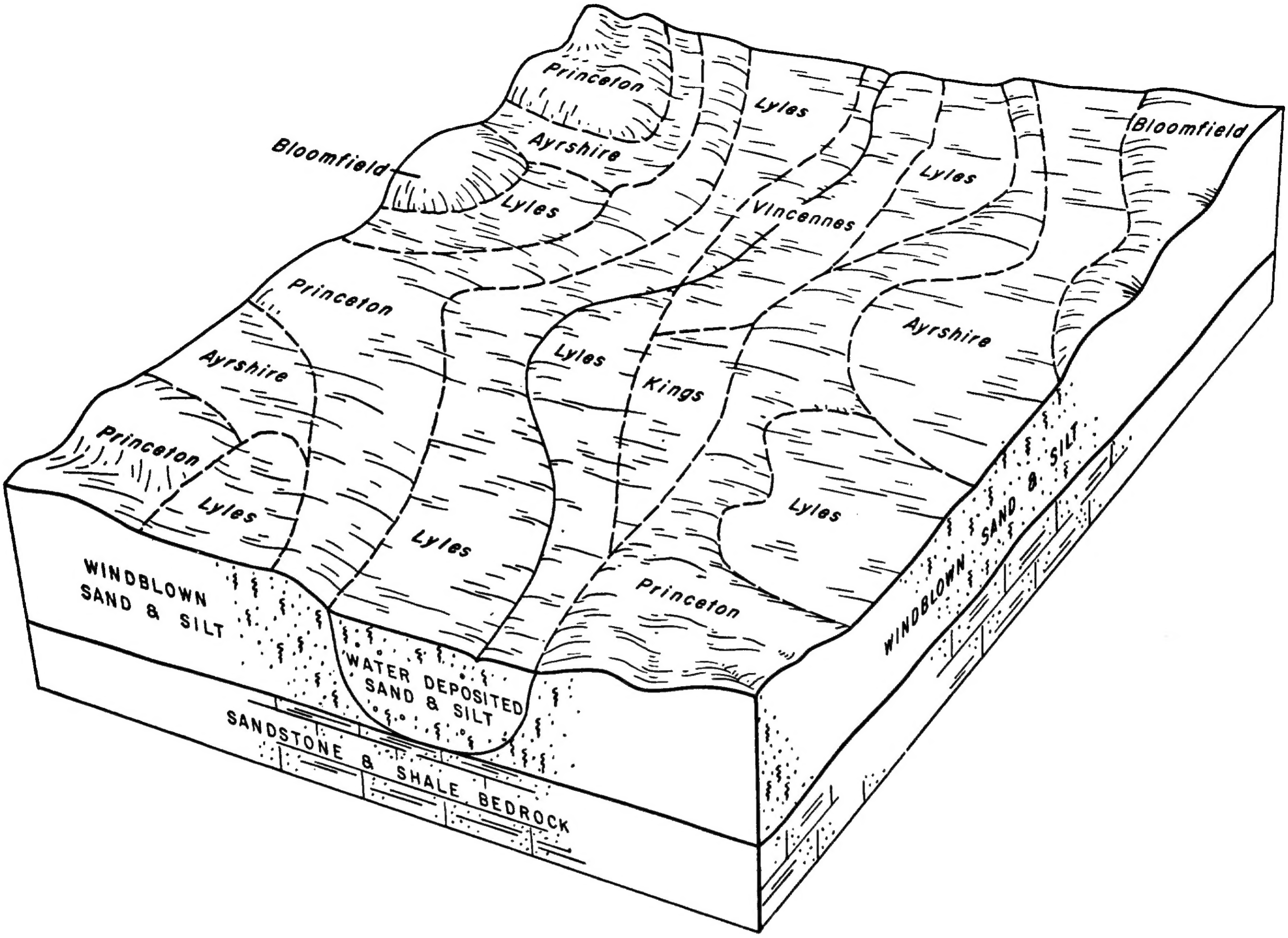

Figure 3.—**Parent material, position, and pattern of soils in the Lyles-Ayrshire-Princeton association.**

Nolin soils are well drained. The surface layer is dark grayish-brown light silty clay loam, and the subsoil is brown light silty clay.

Petrolia soils are poorly drained. The surface layer is dark-gray silty clay loam, and the subsoil is light brownish-gray silty clay loam mottled with dark yellowish brown.

Among the less extensive soils in this association are the nearly level Stendal soils on bottom lands along small streams and the nearly level Wakeland and Armiesburg soils on bottom lands.

The soils in this association are used mainly for crops. Wetness is a limitation on the poorly drained and somewhat poorly drained soils, and flooding is a hazard on all the soils. Some areas along the west fork of the White River, however, are protected by levees.

4. *Ragsdale-Iva-Reesville association*

Deep, very poorly drained and somewhat poorly drained, medium-textured, nearly level and gently sloping soils on uplands

This association consists of nearly level and gently sloping soils that formed in more than 5 feet of loess. These soils are on uplands, mostly in the central and west-central parts of the county. This association makes up about 9 percent of the county. About 33 percent of it is Ragsdale soils, 21 percent is Iva soils, and 16 percent is Reesville soils. The rest is less extensive soils (fig. 5).

Ragsdale soils are in depressions on uplands and are nearly level. These soils are very poorly drained. The surface layer is very dark brown silt loam, and the subsoil is mostly grayish-brown silty clay loam mottled with olive brown.

Iva soils are on uplands and are nearly level and gently sloping. These soils are somewhat poorly drained. The surface layer is grayish-brown silt loam, and the subsoil is light brownish-gray and yellowish-brown silty clay loam mottled with light brownish gray and brownish yellow.

Reesville soils are nearly level and are somewhat poorly drained. The surface layer is dark grayish-brown silt loam, and the subsoil is mostly brown and yellowish-brown silty clay loam mottled with grayish brown.

Among the less extensive soils in this association are the nearly level and gently sloping Iona soils on uplands, the nearly level Wakeland soils on bottom lands, and the nearly level to strongly sloping Hosmer soils on uplands.

The soils in this association are used mainly for corn, soybeans, small grain, meadow, and pasture. Wetness is the major limitation, and erosion is a hazard on the gently sloping soils.

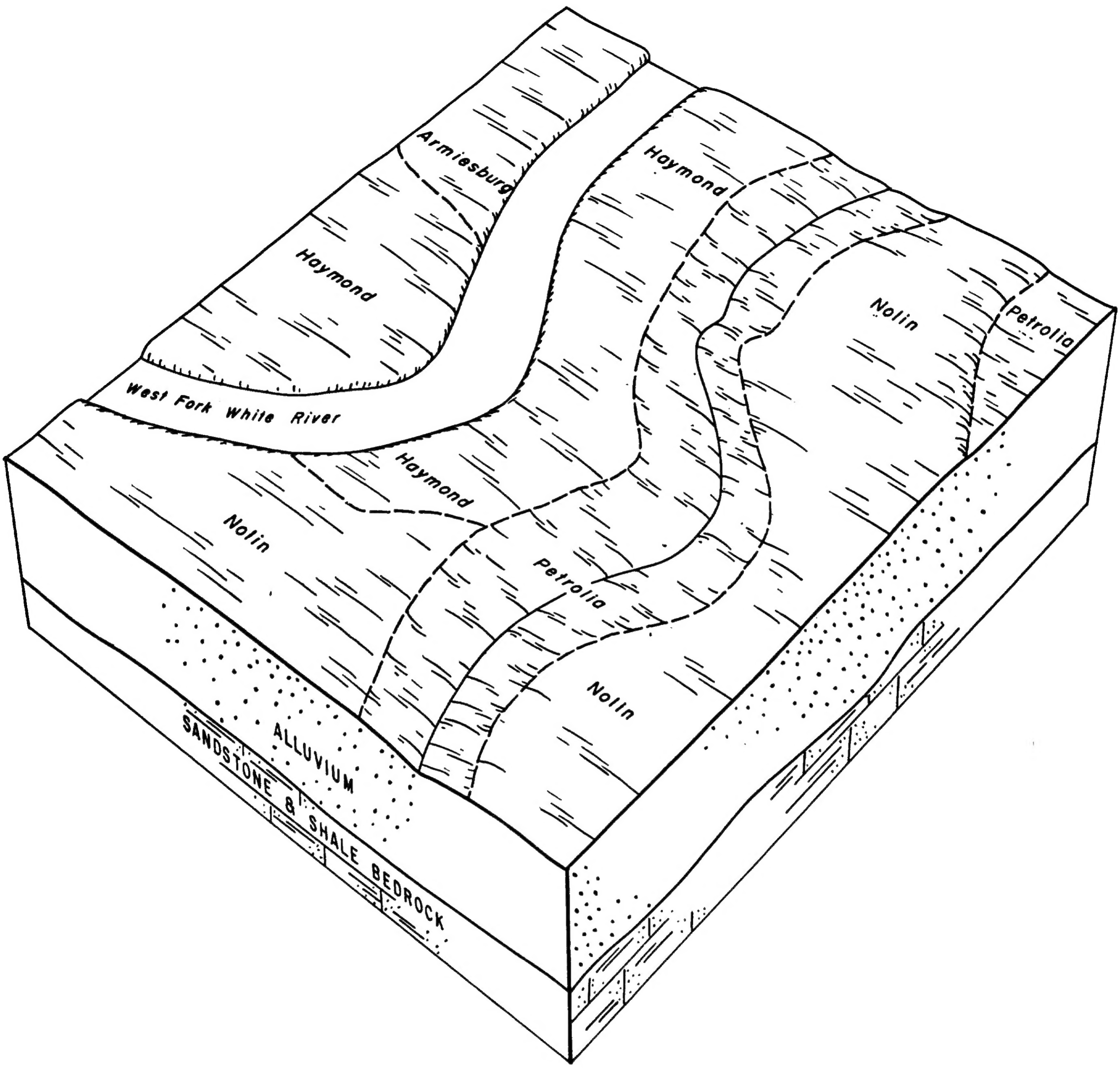

***Figure 4.*—Parent material, position, and pattern of soils in the Haymond-Nolin-Petrolia association.**

5. Bloomfield-Princeton-Ayrshire association

Deep, somewhat excessively drained to somewhat poorly drained, coarse textured and moderately coarse textured, nearly level to steep soils on uplands

This association is on uplands in a long narrow band that roughly parallels the west fork of the White River in the western part of the county. It makes up about 8 percent of the county. About 37 percent of the association is Bloomfield soils, about 30 percent is Princeton soils, and about 17 percent is Ayrshire soils. The rest is less extensive soils (fig. 6).

Bloomfield soils are on uplands and are gently sloping to steep. These soils are somewhat excessively drained. The surface layer is dark grayish-brown loamy fine sand, and the subsoil is yellowish-brown fine sand that has horizontal bands of dark-brown light sandy clay loam.

Princeton soils are on uplands and are nearly level to strongly sloping. These soils are well drained. The surface layer is dark-brown fine sandy loam, and the subsoil is mostly brown sandy clay loam.

Ayrshire soils are on uplands and are nearly level. These soils are somewhat poorly drained. The surface layer is dark grayish-brown fine sandy loam, and the subsoil is light brownish-gray and grayish-brown sandy clay and light clay loam mottled with brown and grayish brown.

Among the less extensive soils in this association are the nearly level Lyles soils in depressions on uplands and

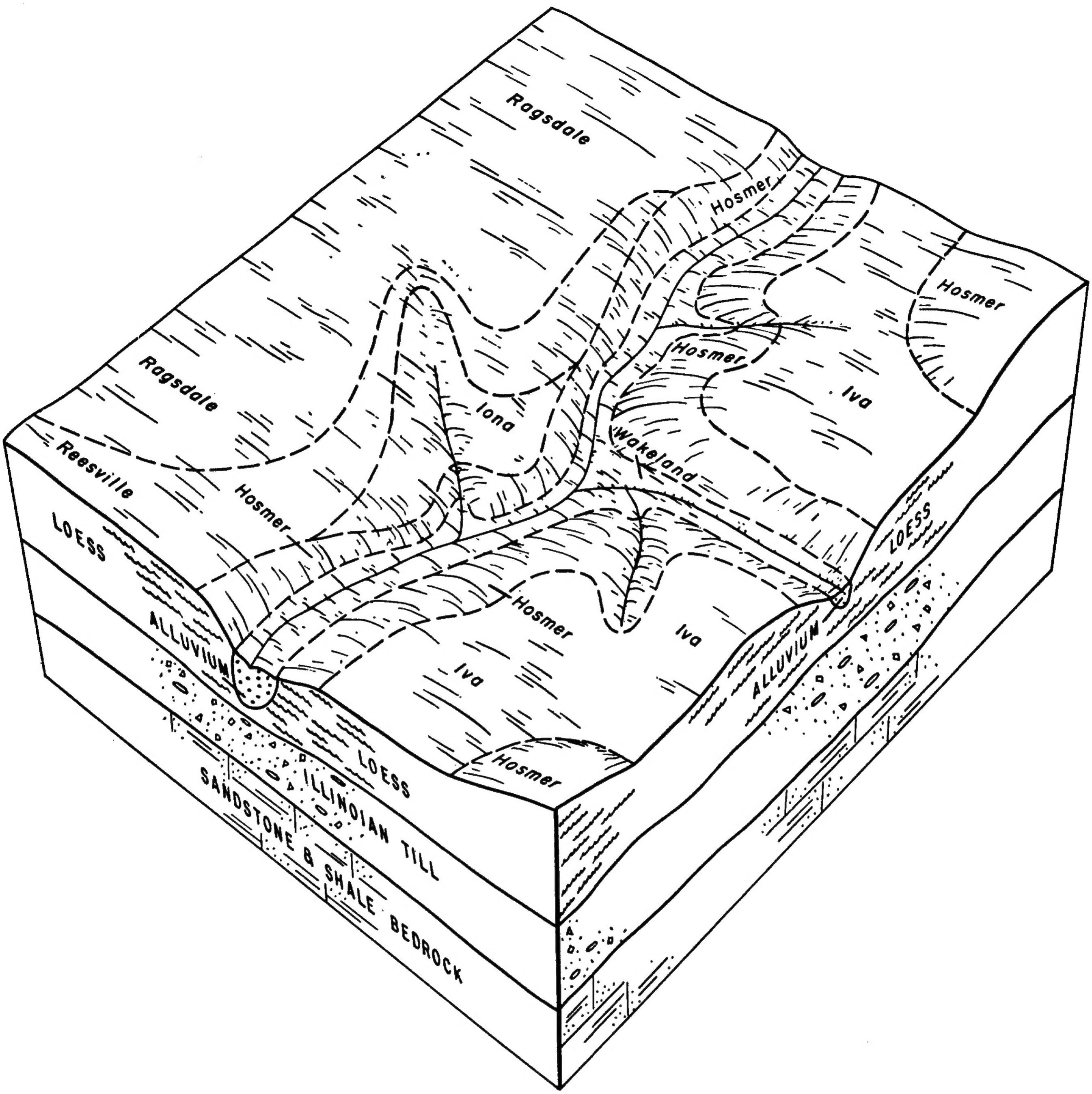

***Figure 5.*—Parent material, position, and pattern of soils in the Ragsdale-Iva-Reesville association.**

terraces and the nearly level Wakeland soils on bottom lands.

The soils in this association are used for corn, soybeans, small grain, melons, meadows, and pasture. Orchard crops also are well suited. Erosion is a hazard where the soils are gently sloping to steep. Wetness is a limitation where the soils are nearly level and somewhat poorly drained and poorly drained. Drought is a potential hazard on the well-drained and somewhat excessively drained soils on uplands.

6. Peoga-Bartle-Hosmer association

Deep, poorly drained to well-drained, medium-textured, nearly level to strongly sloping soils on old lakebeds

This association is in old lakebeds in the eastern part of the county. It makes up about 8 percent of the county. About 36 percent of the association is Peoga soils, about 33 percent is Bartle soils, and about 23 percent is Hosmer soils. The rest is less extensive soils (fig. 7).

Peoga soils are in old lakebeds and are nearly level. These soils are poorly drained. The surface layer is gray

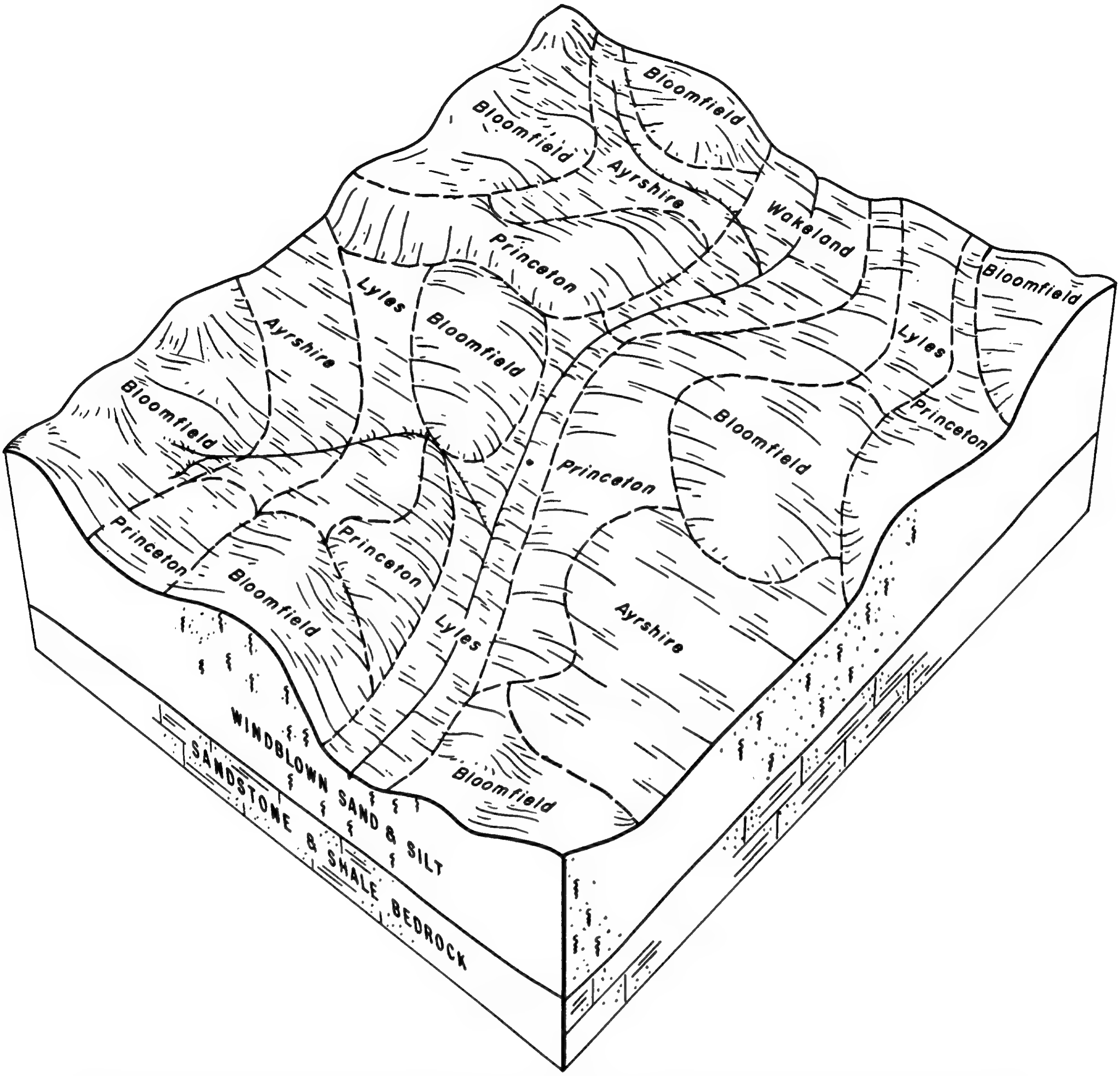

***Figure 6.*—Parent material, position, and pattern of soils in the Bloomfield-Princeton-Ayrshire association.**

silt loam mottled with dark brown, and the subsoil is mostly gray light silty clay loam and silty clay loam mottled with yellowish brown.

Bartle and Hosmer soils have a very slowly permeable, firm and brittle fragipan that restricts the downward movement of roots and water.

Bartle soils are in old lakebeds and are nearly level. These soils are somewhat poorly drained. The surface layer is grayish-brown silt loam. The upper 15 inches of the subsoil is mostly yellowish-brown silt loam mottled with gray, and the lower part is gray heavy silt loam and silty clay loam mottled with yellowish brown.

Hosmer soils are in glacial lakebeds and are nearly level to strongly sloping. These soils are well drained. The surface layer is brown silt loam, and the subsoil is mostly brown and yellowish-brown light silty clay loam.

Among the less extensive soils in this association are the nearly level Wakeland and Stendal soils on bottom lands and moderately steep to very steep Hickory soils on side slopes along natural drainageways.

The soils in this association are used for crops, pasture, and woods. Corn, soybeans, small grain, and pasture plants are the main crops. Erosion and runoff are hazards where the soils are sloping. Wetness is a limitation where the

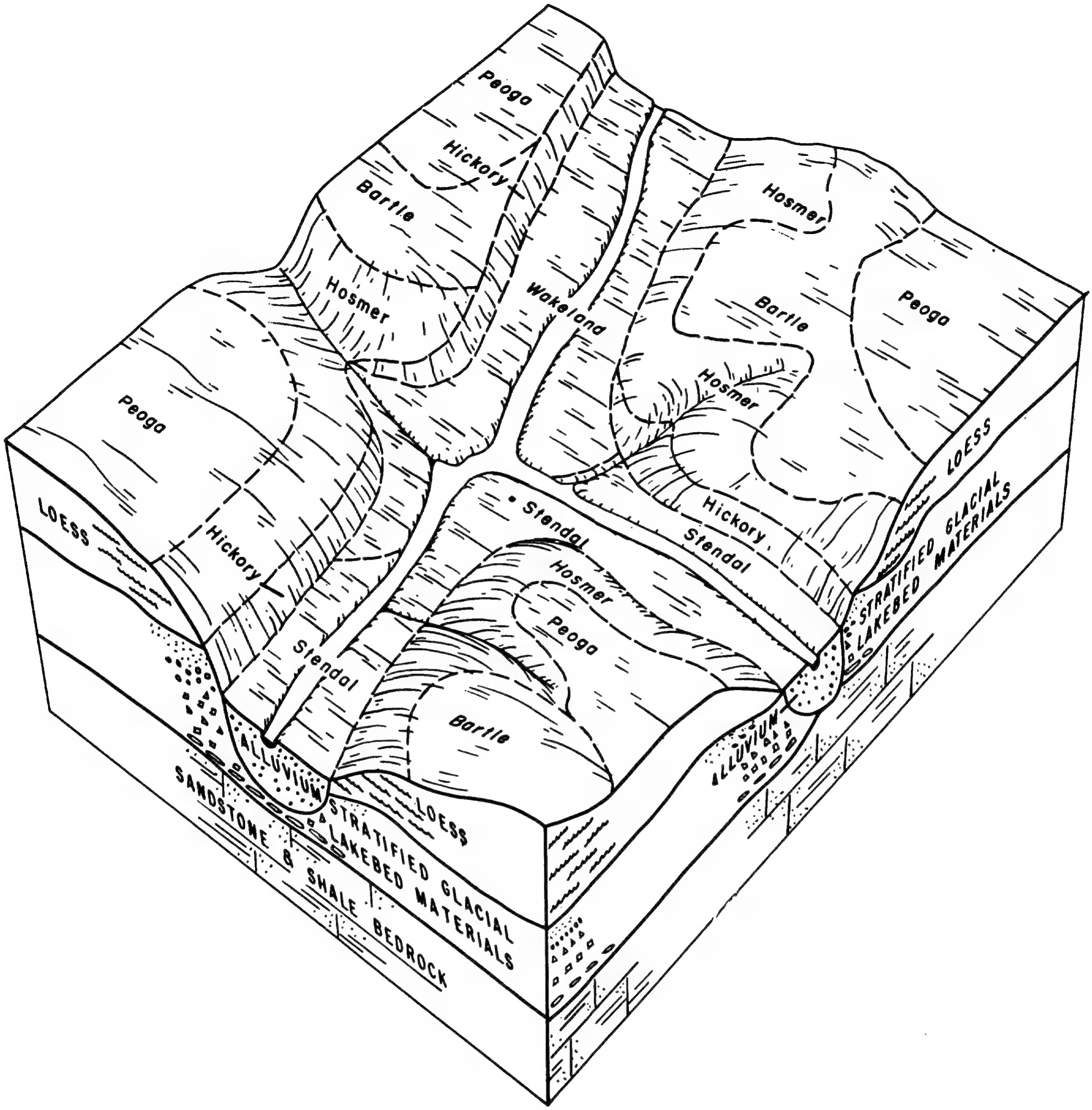

Figure 7.—**Parent material, position, and pattern of soils in the Peoga-Bartle-Hosmer association.**

soils are poorly drained and somewhat poorly drained. A limited root zone and limited available water capacity restrict use on soils that have a fragipan.

7. *Zanesville-Wellston association*

Deep, well-drained, medium-textured, gently sloping to steep soils on uplands

This association is in the northeastern and southern parts of the county. It makes up about 7 percent of the county. About 35 percent of it is Zanesville soils, and about 33 percent is Wellston soils. The rest is less extensive soils (fig. 8).

Zanesville soils are gently sloping to strongly sloping on uplands. These soils are well drained. They formed in about 36 inches of loess and material weathered from sandstone and shale bedrock. The surface layer is dark grayish-brown silt loam, and the subsoil is brown and yellowish-brown light silty clay loam and silt loam. A firm and brittle fragipan, at a depth of about 31 inches, restricts the downward movement of roots and water.

Wellston soils are strongly sloping to steep on up-

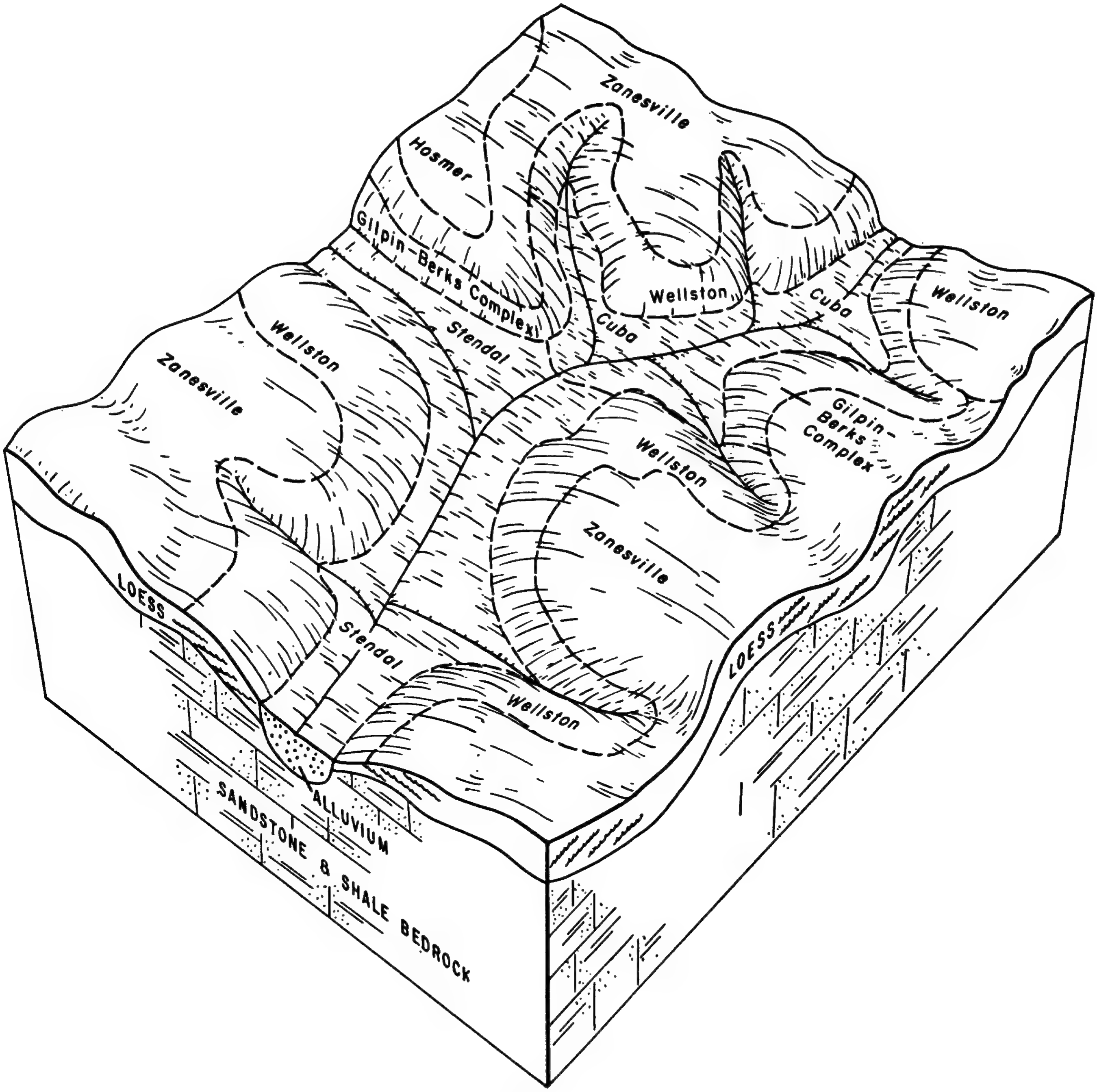

***Figure 8.*—Parent material, position, and pattern of soils in the Zanesville-Wellston association.**

lands. These soils are well drained. They formed in about 18 inches of loess and material weathered from sandstone and shale bedrock. The surface layer is brown silt loam, and the subsoil is brown and yellowish-brown silty clay loam.

Among the less extensive soils in this association are the nearly level to very steep Berks, Gilpin, and Hosmer soils on uplands and the nearly level Cuba and Stendal soils on bottom lands.

The soils in this association are used for crops, pasture, and woods (fig. 9). Erosion and runoff are hazards. A limited root zone restricts use of the soils that are moderately deep or have a fragipan.

8. *Alford association*

Deep, well-drained, medium-textured, gently sloping to moderately steep soils on uplands

This association is on uplands near Washington and Odon. It makes up about 5 percent of the county. About 77 percent of it is Alford soils, and the rest is less extensive soils (fig. 10).

Figure 9.—An aerial view of woodland on Wellston silt loam, 25 to 35 percent slopes, and Gilpin-Berks complex, 25 to 50 percent slopes. The soils in this association provide a good site for one of the flood control structures on the Prairie Creek Watershed.

Alford soils are gently sloping to moderately steep. These soils are well drained. They formed in more than 5 feet of loess. The surface layer is brown silt loam, and the subsoil is brown and dark yellowish-brown light silty clay loam.

Among the less extensive soils in this association are the nearly level to very steep Hickory, Parke, and Wellston soils on uplands and the nearly level Wakeland soils on bottom lands.

The soils in this association are used for crops, pasture, and woods. Some areas are being used for residential development because they are near urban centers. Erosion and runoff are hazards where the soils are gently sloping to moderately steep.

Descriptions of the Soils

This section describes the soil series and mapping units in Daviess County. Each soil series is described in considerable detail, and then each mapping unit in that series is briefly described. Unless mentioned otherwise, the reader can assume that what is stated about the soil series is true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second, detailed and in technical terms, is for scientists, engineers, and others who need to make thorough and precise studies of soils. Unless stated otherwise, the colors and consistence given in the descriptions are those of a moist soil.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Strip mines, for example, does not belong to a soil series, but nevertheless, is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland

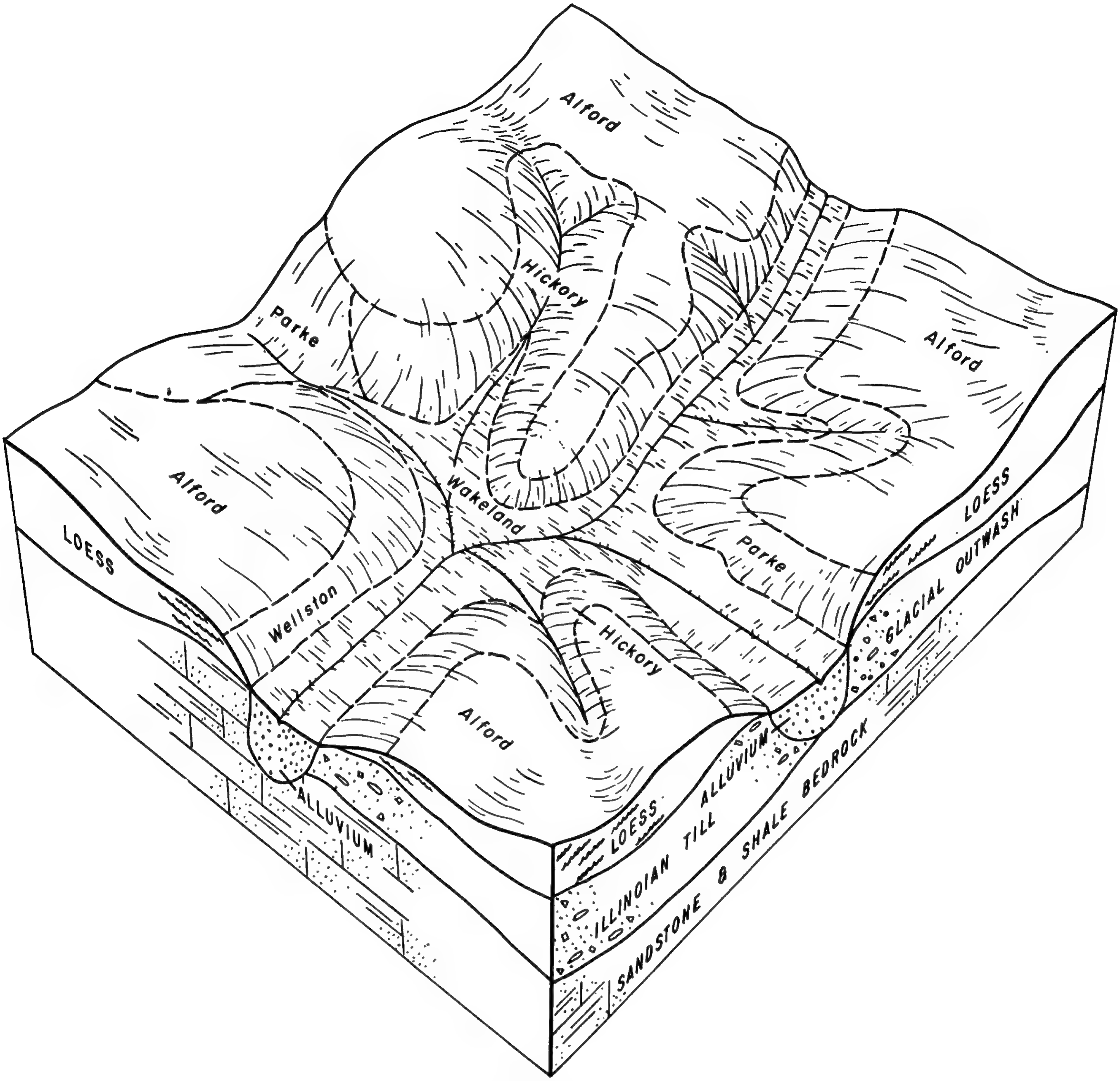

Figure 10.—**Parent material, position, and pattern of soils in the Alford association.**

group in which the mapping unit has been placed. The page for the description of each capability unit and woodland group can be found by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary at the end of this survey, and more detailed information about the terminology and methods of soil mapping can be obtained from the "Soil Survey Manual" (*5*).[1]

[1] Italic numbers in parentheses refer to Literature Cited, p. 83.

Alford Series

The Alford series consists of deep, well-drained, gently sloping to moderately steep soils that formed in more than 5 feet of loess on uplands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is brown silt loam about 8 inches thick. The subsoil, about 42 inches thick, is dark yellowish-brown, friable heavy silt loam in the upper 5 inches and is brown, firm light silty clay loam and friable silt loam in the lower 37 inches. The underlying material, to a depth of 60 inches, is brown to dark yellowish-brown silt loam.

Table 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent
	Acres	*Percent*
Alford silt loam, 2 to 6 percent slopes, eroded	2, 750	1. 0
Alford silt loam, 2 to 6 percent slopes, severely eroded	337	. 1
Alford silt loam, 6 to 12 percent slopes, eroded	1, 950	. 7
Alford silt loam, 6 to 12 percent slopes, severely eroded	1, 250	. 4
Alford silt loam, 12 to 18 percent slopes, eroded	385	. 1
Alford silt loam, 12 to 18 percent slopes, severely eroded	790	. 3
Alford silt loam, 18 to 25 percent slopes, eroded	630	. 2
Alford silt loam, 18 to 25 percent slopes, severely eroded	354	. 1
Armiesburg silty clay loam	1, 950	. 7
Ayrshire fine sandy loam	11, 000	4. 1
Bartle silt loam	6, 900	. 2
Bloomfield loamy fine sand, 2 to 6 percent slopes	1, 400	. 5
Bloomfield loamy fine sand, 6 to 12 percent slopes	4, 200	1. 5
Bloomfield loamy fine sand, 12 to 18 percent slopes	3, 000	1. 0
Bloomfield loamy fine sand, 18 to 35 percent slopes	1, 250	. 4
Bonnie silt loam	2, 250	. 8
Cincinnati silt loam, 2 to 6 percent slopes, eroded	1, 850	. 6
Cincinnati silt loam, 6 to 12 percent slopes, eroded	3, 750	1. 3
Cincinnati silt loam, 6 to 12 percent slopes, severely eroded	8, 200	3. 0
Cincinnati silt loam, 12 to 18 percent slopes, eroded	2, 800	1. 0
Cincinnati silt loam, 12 to 18 percent slopes, severely eroded	7, 600	2. 7
Cuba silt loam	1, 250	. 4
Elston loam	510	. 1
Gilpin-Berks complex, 25 to 50 percent slopes	2, 650	. 9
Haymond silt loam	15, 400	5. 6
Hickory silt loam, 18 to 25 percent slopes, eroded	3, 300	1. 1
Hickory silt loam, 25 to 50 percent slopes	1, 500	. 5
Hosmer silt loam, 0 to 2 percent slopes	1, 500	. 5
Hosmer silt loam, 2 to 6 percent slopes, eroded	29, 750	13. 8
Hosmer silt loam, 2 to 6 percent slopes, severely eroded	4, 100	1. 4
Hosmer silt loam, 6 to 12 percent slopes, eroded	3, 250	1. 1
Hosmer silt loam, 6 to 12 percent slopes, severely eroded	8, 200	2. 9
Hosmer silt loam, 12 to 18 percent slopes, eroded	1, 200	. 4
Hosmer silt loam, 12 to 18 percent slopes, severely eroded	2, 650	. 9
Iona silt loam, 0 to 2 percent slopes	2, 250	. 8
Iona silt loam, 2 to 6 percent slopes, eroded	1, 500	. 5
Iva silt loam, 0 to 2 percent slopes	23, 250	8. 4
Iva silt loam, 2 to 4 percent slopes, eroded	990	. 3
Kings silty clay	1, 150	. 4
Lyles fine sandy loam	7, 300	2. 6
Lyles loam	10, 700	3. 8
Markland silt loam, 2 to 6 percent slopes, eroded	386	. 1
Markland silt loam, 6 to 18 percent slopes, eroded	384	. 1
McGary silt loam	520	. 2
Montgomery silty clay loam	640	. 2
Negley loam, 25 to 50 percent slopes	345	. 1
Nolin silty clay loam	6, 600	2. 4
Parke silt loam, 2 to 6 percent slopes, eroded	700	. 3
Parke silt loam, 6 to 12 percent slopes, eroded	345	. 1
Parke silt loam 6 to 12 percent slopes, severely eroded	1, 250	. 5
Parke silt loam, 12 to 18 percent slopes, eroded	376	. 1
Peoga silt loam	7, 400	2. 7
Petrolia silty clay loam	6, 600	2. 3
Princeton fine sandy loam, 0 to 2 percent slopes	450	. 1
Princeton fine sandy loam, 2 to 6 percent slopes, eroded	4, 200	1. 5
Princeton fine sandy loam, 6 to 12 percent slopes, eroded	415	. 1
Princeton fine sandy loam, 12 to 18 percent slopes, eroded	660	. 2
Ragsdale silt loam	10, 900	3. 9
Reesville silt loam	4, 750	1. 7
Ross loam	720	. 2
Stendal silt loam	6, 600	2. 4
Strip mines	1, 290	. 5
Vigo silt loam	8, 100	2. 9
Vincennes clay loam	2, 000	. 7
Wakeland silt loam	7, 200	2. 5
Wellston silt loam, 12 to 18 percent slopes, eroded	2, 260	. 8
Wellston silt loam, 12 to 18 percent slopes, severely eroded	2, 550	. 9
Wellston silt loam, 18 to 25 percent slopes	1, 950	. 7
Wellston silt loam, 25 to 35 percent slopes	750	. 3
Zanesville silt loam, 2 to 6 percent slopes, eroded	3, 150	1. 1
Zanesville silt loam, 6 to 12 percent slopes, eroded	2, 200	. 8
Zanesville silt loam, 6 to 12 percent slopes, severely eroded	1, 600	. 6
Zanesville silt loam, 12 to 18 percent slopes, eroded	650	. 2
Zanesville silt loam, 12 to 18 percent slopes severely eroded	333	. 1
Zipp silty clay loam	930	. 3
Zipp silty clay loam, overwash	920	1. 3
Total	277, 120	100. 0

Alford soils are moderate in organic-matter content. The surface layer is medium acid unless limed. These soils are moderately permeable and have a high available water capacity. Surface runoff is medium to very rapid.

Runoff and erosion are the major hazards in the use and management of these soils. If properly managed, these soils are suited to most crops commonly grown in the county.

Representative profile of Alford silt loam, 6 to 12 percent slopes, eroded, in a cultivated field at a point 1,580 feet west and 200 feet north of the southeast corner of sec. 14, T. 3 N., R. 7 W.:

Ap—0 to 8 inches, brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; neutral; abrupt, smooth boundary.

B1—8 to 13 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; moderate, fine, subangular blocky structure; friable; thin brown (10YR 5/3) coatings on some faces of peds; medium acid; clear, smooth boundary.

B21t—13 to 23 inches, brown (7.5YR 4/4) light silty clay loam; moderate to strong, medium, subangular blocky structure; firm; thin dark reddish-brown (5YR 3/4) clay films on faces of peds; very dark brown (10YR 2/2) coatings on some peds; medium acid; clear, smooth boundary.

B22t—23 to 35 inches, brown (7.5YR 4/4) light silty clay loam; moderate, medium and coarse, subangular blocky structure; firm; thin dark reddish-brown (5YR 3/4) clay films on faces of peds; very dark brown (10YR 2/2) coatings and splotches; medium acid; gradual, wavy boundary.

B3—35 to 50 inches, brown (7.5YR 4/4) and dark yellowish-brown (10YR 4/4) silt loam; weak, coarse, subangular blocky structure; friable; few, discontinuous, dark reddish-brown (5YR 3/4) clay films on some peds; pale-brown (10YR 6/3) silt streaks and coatings; few very dark brown (10YR 2/2) splotches; strongly acid; gradual, wavy boundary.

C—50 to 60 inches, brown (7.5YR 4/4) to dark yellowish-brown (10YR 4/4) silt loam; massive; friable; few streaks of light brownish gray (10YR 6/2) and pale brown (10YR 6/3); medium acid.

The Ap horizon ranges from brown to dark yellowish brown in color. In slightly eroded areas the Ap horizon is mainly dark grayish brown. A brown A2 horizon, 2 to 6 inches thick, is in some areas. The B2 horizon ranges from yellowish brown to strong brown in color and from heavy silt loam to silty clay loam in texture. The solum ranges from 40 to 60 inches in thickness. The C horizon normally is medium acid or slightly acid.

Alford soils are similar to Hosmer and Princeton soils. They are less acid than Hosmer soils and lack the fragipan of those soils. They differ from Princeton soils because they are more acid and have less sand throughout.

Alford silt loam, 2 to 6 percent slopes, eroded (AlB2).—This soil is on narrow ridgetops and on long uniform side slopes. It has a profile similar to that described as representative for the series, but the plow layer is a mixture of the original surface layer and a moderate amount of the dark yellowish-brown subsoil. Surface runoff is medium. Included with this soil in mapping are small areas of moderately well drained soils. Also included are a few small areas of soils that have slopes of less than 2 percent.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. This soil is also well suited to orchards. Erosion and runoff are the major hazards. (Capability unit IIe–3; woodland suitability group 1o1)

Alford silt loam, 2 to 6 percent slopes, severely eroded (AlB3).—This soil is on long, uniform side slopes below ridgetops. It has a profile similar to that described as representative for the series, but it has had from 7 inches to all of its original surface layer removed through erosion. The plow layer is mostly material from the dark yellowish-brown subsoil. Surface runoff is rapid. Included with this soil in mapping are small areas of moderately well drained soils.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Good seedbeds are more difficult to prepare on this soil than on the less eroded Alford soils, and this results in poorer stands. This soil is well suited to orchards. Erosion and runoff are the major hazards. (Capability unit IIIe–3; woodland suitability group 1o1).

Alford silt loam, 6 to 12 percent slopes, eroded (AlC2).—This soil is on the sides of natural draws and on short slopes below ridgetops. It has the profile described as representative for the series. From 4 to 6 inches of the original surface layer has been removed by erosion, and the plow layer is a mixture of the original surface layer and a moderate amount of the dark yellowish-brown subsoil. Surface runoff is medium. Included with this soil in mapping are small areas of soils that have slopes of more than 12 percent. Also included are small areas of severely eroded soils.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. This soil also is suited to orchards. Erosion and runoff are the major hazards. (Capability unit IIIe–3; woodland suitability group 1o1)

Alford silt loam, 6 to 12 percent slopes, severely eroded (AlC3).—This soil is on the sides of natural draws and on short slopes below ridgetops. It has a profile similar to that described as representative for the series, but from 7 inches to all of its original surface layer has been removed by erosion. The plow layer is mostly dark yellowish-brown material that formerly was subsoil. Surface runoff is rapid.

This soil is suited to small grain, meadow, and pasture. It also is suited to orchards. Good seedbeds are more difficult to prepare on this soil than on the less eroded Alford soils, and this results in poorer stands. Erosion and runoff are the major hazards. The severe hazard of erosion limits use for row crops. (Capability unit IVe–3; woodland suitability group 1o1)

Alford silt loam, 12 to 18 percent slopes, eroded (AlD2).—This soil is on the sides of natural draws and on uniform slopes below ridgetops. It has a profile similar to that described as representative for the series, but it is slightly thinner. The plow layer is a mixture of the original surface layer and a moderate amount of the dark yellowish-brown subsoil. Surface runoff is rapid. Included with this soil in mapping are small areas of slightly eroded soils in permanent pasture or woodland that have a dark grayish-brown surface layer. Also included are small areas of severely eroded soils.

This soil is suited to small grain, meadow, and pasture. It also is well suited to orchards. Erosion and runoff are the major hazards. The severe hazard of erosion limits use for row crops. (Capability unit IVe–3; woodland suitability group 1o1)

Alford silt loam, 12 to 18 percent slopes, severely eroded (AlD3).—This soil is on the sides of natural draws and on uniform slopes below ridgetops. It has a profile similar to that described as representative for the series,

but it is slightly thinner and has had from 7 inches to all of its original surface layer removed by erosion. The plow layer is mostly material from the dark yellowish-brown subsoil. Surface runoff is very rapid. Included with this soil in mapping are small areas of slightly eroded soils in permanent pasture or woodland that have a dark grayish-brown surface layer. Also included are small areas that are gullied.

This soil is suited to meadow, pasture, and orchards. Erosion and runoff are the major hazards. (Capability unit VIe-1; woodland suitability group 1o1)

Alford silt loam, 18 to 25 percent slopes, eroded (AlE2).—This soil is on the sides of natural draws and on side slopes below ridgetops. It has a profile similar to that described as representative for the series, but it is thinner. The plow layer is a mixture of the original surface layer and a moderate amount of the subsoil. Surface runoff is rapid. Included with this soil in mapping are areas of slightly eroded soils in permanent pasture or woodland that have a dark grayish-brown surface layer. Also included are small areas of severely eroded soils and some areas of soils that have slopes of more than 25 percent.

This soil is suited to permanent pasture and woodland. Runoff and erosion are the major hazards. (Capability unit VIe-1; woodland suitability group 1r2)

Alford silt loam, 18 to 25 percent slopes, severely eroded (AlE3).—This soil is on the sides of natural draws and on side slopes below ridgetops. It has a profile similar to that described as representative for the series, but it has lost from 5 to 7 inches of its original surface layer through erosion. The present surface layer is mostly dark yellowish-brown subsoil material but contains a moderate amount of the original surface layer. Included with this soil in mapping are small areas of soils that have deep gullies.

This soil is suited only to permanent pasture or woodland because of steep slopes, very rapid runoff, and a very severe hazard of erosion. Runoff and erosion are the major hazards. (Capability unit VIe-1; woodland suitability group 1r2)

Armiesburg Series

The Armiesburg series consists of deep, well-drained soils that formed in alluvium on bottom lands. The native vegetation was prairie grasses.

In a representative profile, the surface layer is very dark grayish-brown silty clay loam about 15 inches thick. The subsoil is firm, brown silty clay loam about 15 inches thick. The underlying material, extending to a depth of 60 inches, is brown light silty clay loam.

Armiesburg soils are high in organic-matter content. The surface layer is neutral. These soils are moderately slowly permeable and have a high available water capacity. Surface runoff is slow or very slow.

Flooding is the major hazard in the use and management of these soils. The soils are suited to most crops commonly grown in the county.

Representative profile of Armiesburg silty clay loam in a cultivated field at a point 50 feet north and 100 feet east of the southwest corner of NW¼NW¼ sec. 30, T. 3 N., R. 7 W.:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silty clay loam; moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A1—7 to 15 inches, very dark grayish-brown (10YR 3/2) silty clay loam; moderate, medium, subangular blocky structure; firm; neutral; clear, wavy boundary.

B21—15 to 20 inches, brown (10YR 5/3) silty clay loam; moderate, coarse, prismatic structure parting to moderate, medium, subangular blocky structure; firm; few, thin, dark grayish-brown (10YR 4/2) clay films on most faces of peds; neutral; gradual, wavy boundary.

B22—20 to 30 inches, brown (10YR 5/3) silty clay loam; weak, medium and coarse, prismatic structure; firm; few, thin, dark grayish-brown (10YR 4/2) organic films on faces of peds and in crack fillings; light brownish-gray (10YR 6/2) silt coatings on some peds and in crack fillings; neutral; gradual, wavy boundary.

C—30 to 60 inches, brown (10YR 5/3) light silty clay loam; few, medium, distinct mottles of light brownish gray (10YR 6/2); massive; friable; few, small, black (10YR 2/1) iron and manganese concretions; neutral.

The A horizon ranges from very dark brown to dark brown in color and from 10 to 20 inches in thickness. The B horizon is dominantly brown silty clay loam. It has gray mottles below a depth of 24 inches in some areas. The C horizon ranges from light to heavy silty clay loam in texture. Some areas have thin strata of coarse materials below a depth of 50 inches.

Armiesburg soils are similar to Ross and Haymond soils. They differ from Ross soils because they have a dark-colored A horizon that is less than 20 inches thick. They differ from Haymond soils because they have a dark-colored A horizon and formed in finer textured materials.

Armiesburg silty clay loam (0 to 2 percent slopes) (Ar).—This soil is on broad bottom lands. Surface runoff is slow or very slow. Included with this soil in mapping are small areas of moderately well drained soils. Also included are small areas of soils that have a dark-colored surface layer that is more than 20 inches thick.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, and meadow. Flooding is the major hazard. Most areas are protected by levees, but during periods of high water in winter and early in spring, seepage through levees causes some flooding. Alfalfa and small grain are subject to severe damage during periods of prolonged flooding. (Capability unit I-2; woodland suitability group o23)

Ayrshire Series

The Ayrshire series consists of deep, somewhat poorly drained, nearly level soils that formed in wind-deposited sand and coarse silt on uplands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is dark grayish-brown fine sandy loam about 9 inches thick. The subsurface layer is light brownish-gray fine sandy loam, about 5 inches thick, that contains mottles of brown. The subsoil is about 29 inches thick. The upper 5 inches of the subsoil is mottled light brownish-gray, light yellowish-brown, and brown, friable fine sandy loam. The middle part is mottled, light brownish-gray and grayish-brown, firm sandy clay loam to light clay loam, and the lower part is mottled, gray, firm sandy clay loam. The underlying material, extending to a depth of 60 inches, is brown and gray, stratified fine sandy loam and fine sand.

Ayrshire soils are moderate in organic-matter content. The surface layer is medium acid unless limed. These soils are moderately permeable and have a high available water capacity. Surface runoff is slow.

Wetness is the major limitation in the use and management of these soils. Ayrshire soils are suited to all crops commonly grown in the county.

Representative profile of Ayrshire fine sandy loam in a cultivated field at a point 50 feet south and 100 feet west of the northeast corner of NW¼SE¼ sec. 35, T. 4 N., R. 7 W.:

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A2—9 to 14 inches, light brownish-gray (10YR 6/2) fine sandy loam; few, medium, distinct mottles of brown (7.5YR 4/4); weak, medium, platy structure to weak, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B1—14 to 19 inches, light brownish-gray (10YR 6/2), light yellowish-brown (2.5Y 6/4), and brown (7.5YR 4/4) fine sandy loam; weak, medium, subangular blocky structure; friable; few, thin, dark-gray (10YR 4/1) clay films on some faces of peds; slightly acid; clear, smooth boundary.

B21t—19 to 30 inches, light brownish-gray (10YR 6/2) and grayish-brown (10YR 5/2) sandy clay loam to light clay loam; common, medium, prominent mottles of brown (7.5YR 4/4); weak, medium, prismatic structure parting to moderate, medium, subangular blocky structure; firm; few, thin, grayish-brown (10YR 5/2) clay films on most faces of peds; medium acid; clear, smooth boundary.

B22t—30 to 43 inches, gray (10YR 5/1) sandy clay loam; many, medium, prominent mottles of strong brown (7.5YR 5/6); weak, coarse, subangular blocky structure; firm; few, thin, gray (10YR 5/1) clay films; slightly acid; clear, irregular boundary.

C—43 to 60 inches, brown (7.5YR 4/4) and gray (10YR 5/1), stratified fine sandy loam and fine sand; massive; friable; moderately alkaline (calcareous).

The Ap horizon ranges from dark grayish brown to brown in color. The B22t horizon ranges from gray to light gray. The B2 horizon ranges from sandy clay loam to light clay loam in texture. Depth to the C horizon ranges from 36 to 60 inches.

Ayrshire soils are similar to Reesville and Iva soils. They have more sand in the profile than Reesville and Iva soils. They are not so deeply leached as Iva soils.

Ayrshire fine sandy loam (0 to 2 percent slopes) (Ay).—This soil is on broad flats on uplands. Surface runoff is slow. Included with this soil in mapping are areas of soils that have a loam surface layer and soils that have a dark surface layer. Also included are small areas of gently sloping soils.

If a suitable drainage system is established and maintained, this soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Use of crop residue and green-manure crops help to improve or maintain a desirable level of organic-matter content. Wetness is the major limitation. (Capability unit IIIw-4; woodland suitability group 3w5)

Bartle Series

The Bartle series consists of deep, somewhat poorly drained soils that formed in about 45 inches of loess and in stratified glacial lakebed materials. A firm and brittle fragipan is at a depth of about 25 inches. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is grayish-brown silt loam about 10 inches thick. The subsurface layer is mottled, gray and yellowish-brown silt loam about 10 inches thick. The subsoil is mottled, gray, and firm and is about 50 inches thick. The upper 19 inches is heavy silt loam, and the lower part is silty clay loam. The underlying material, extending to a depth of 112 inches, is mottled, gray, stratified silty clay loam, silty clay, and silt loam.

Bartle soils are low in organic-matter content. The surface layer is strongly acid unless limed. These soils are very slowly permeable and have a low available water capacity. Surface runoff is slow.

Wetness and the very slowly permeable subsoil are the major limitations in the use and management of these soils. If drained, the soils are suited to most crops commonly grown in the county.

Representative profile of Bartle silt loam in a cultivated field at a point 360 feet south and 75 feet east of the northwest corner of sec. 27, T. 3 N., R. 5 W.:

Ap—0 to 10 inches, grayish-brown (10YR 5/2) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A21—10 to 13 inches, gray (10YR 6/1) silt loam; many, medium, distinct mottles of yellowish brown (10YR 5/4); weak, thin to medium, platy structure; friable; slightly acid; clear, wavy boundary.

A22—13 to 20 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, distinct mottles of gray (10YR 6/1); weak, medium, prismatic structure breaking to weak, medium, subangular blocky structure; friable; medium acid; clear, wavy boundary.

B21tg—20 to 25 inches, gray (10YR 6/1) heavy silt loam; many, medium, distinct mottles of dark yellowish brown (10YR 4/4); moderate, medium, prismatic structure; firm; thin gray (10YR 6/1) silt films on faces of peds; thin gray (10YR 6/1) clay films on linings in old voids; very strongly acid; clear, irregular boundary.

Bxg—25 to 39 inches, gray (5Y 6/1) heavy silt loam (26 percent clay); many, medium, distinct mottles of dark yellowish brown (10YR 4/4); moderate, coarse, prismatic structure; firm; brittle; thick gray (5Y 6/1) clay films on faces of peds and thin light-gray (10YR 7/1) silt films on prismatic faces and fillings in krotovinas; few, black, iron manganese oxide concretions; very strongly acid; clear, wavy boundary.

IIB22tg—39 to 70 inches, gray (N 6/0) silty clay loam; many, medium mottles of dark yellowish brown (10YR 4/4) and dark reddish brown (5YR 3/3); weak, coarse, prismatic structure; firm; gray (10YR 6/1) clay films on prisms and gray (10YR 6/1) silt coatings and fillings in krotovinas; common black manganese and iron concretions; few fine chert fragments; strongly acid; diffuse, wavy boundary.

Cg—70 to 112 inches, gray (N 6/0), stratified silty clay loam, silty clay, and silt loam; many, coarse mottles of yellowish brown (10YR 5/6); massive; firm; few, thick, gray (10YR 5/1) clay films in crack fillings; few fine chert fragments; neutral.

The Ap horizon ranges from dark grayish brown to grayish brown or brown in color. In some areas the A2 horizon is gray and there is an abrupt change in texture between the A2 horizon and the B2 horizon. Tongues of A2 material extend into the B2 horizon. The Bx horizon ranges from silt loam to light silty clay loam in texture. The C horizon ranges from medium acid to neutral.

Bartle soils are similar to Iva and Vigo soils. They differ from Iva soils because they have a thicker A2 horizon and have a fragipan. They differ from Vigo soils because they have a lower clay content in the upper part of the B horizon and have a fragipan.

Bartle silt loam (0 to 2 percent slopes) (Ba).—This soil is on old glacial lake terraces. Runoff is slow. Included with this soil in mapping are small areas of poorly drained soils.

This soil is suited to most crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, small

grain, meadow, and pasture. Alfalfa and other deep-rooted crops are not well suited, because of the very slowly permeable subsoil. The major limitations are wetness and the very slowly permeable subsoil. This very slowly permeable layer restricts root penetration and water movement. (Capability unit IIIw-3; woodland suitability group 3w5)

Berks Series

The Berks series consists of moderately deep, somewhat excessively drained, steep and very steep soils that formed in material weathered from sandstone and shale bedrock on uplands. The native vegetation was mixed hardwood forest. Berks soils in Daviess County are mapped only in a complex with Gilpin soils. For a description of this complex, see the Gilpin series.

In a representative profile, the surface layer is very dark grayish-brown channery silt loam about 2 inches thick. The subsurface layer is light yellowish-brown channery silt loam about 5 inches thick. The subsoil is yellowish-brown, friable channery silt loam about 15 inches thick. The underlying material is yellowish-brown and light yellowish-brown channery silt loam. Bedded, fractured siltstone and sandstone are at a depth of about 30 inches.

Berks soils are low in organic-matter content. The surface layer is strongly acid. These soils are moderately permeable and have a moderately low available water capacity. Surface runoff is very rapid.

Runoff, erosion, and steep slopes are the major hazards in the use and management of these soils. These soils are suited to permanent vegetation.

Representative profile of Berks channery silt loam in an area of Gilpin-Berks complex, 25 to 50 percent slopes, in a woods at a point 140 feet south and 150 feet east of the northwest corner of NE¼ sec. 15, T. 4 N., R. 5 W.:

O1—1 inch to 0, partly decomposed leaf litter.

A1—0 to 2 inches, very dark grayish-brown (10YR 3/2) channery silt loam; weak, fine, granular structure; very friable; strongly acid; clear, smooth boundary.

A2—2 to 7 inches, light yellowish-brown (10YR 6/4) channery silt loam; weak, thin, platy structure; friable; 10 percent coarse fragments; strongly acid; clear, wavy boundary.

B21—7 to 17 inches, yellowish-brown (10YR 5/4) channery silt loam; weak, fine and medium, subangular blocky structure; friable; 30 percent coarse fragments; few, thin, patchy, strong-brown (7.5YR 5/6) clay films; strongly acid; gradual, wavy boundary.

B22—17 to 22 inches, yellowish-brown (10YR 5/4–5/6) channery silt loam; weak, medium and coarse, subangular blocky structure; friable; 45 percent coarse fragments; few, thin, patchy, strong-brown (7.5YR 5/6) clay films; very strongly acid; gradual, wavy boundary.

C—22 to 30 inches, yellowish-brown (10YR 5/4) and light yellowish-brown (10YR 6/4) channery silt loam; massive; friable; more than 60 percent coarse fragments; very strongly acid.

R—30 inches, bedded, fractured siltstone and sandstone.

The undisturbed A1 horizon ranges from dark gray to very dark grayish brown in color. The A horizon, if disturbed, is dark brown or brown. Horizons between depths of 10 and 40 inches are, on the average, more than 35 percent channery material, by volume. The B horizon ranges from 10 to 20 inches in thickness. Depth to bedrock ranges from 20 to 48 inches.

Berks soils are similar to Gilpin soils, but they lack a textural B horizon and have a higher percentage of coarse (channery) material throughout.

Bloomfield Series

The Bloomfield series consists of deep, somewhat excessively drained, gently sloping to steep soils that formed in more than 6 feet of windblown sand on uplands. In these soils clay has accumulated in discontinuous, thin, horizontal bands in the subsoil. Bloomfield soils occupy hummocky topography in a narrow band that roughly parallels the White River. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is dark grayish-brown loamy fine sand about 10 inches thick. The subsurface layer is yellowish-brown loamy fine sand about 17 inches thick. The next layer is about 43 inches of banded, yellowish-brown and dark-brown, friable fine sandy loam and light sandy clay loam. The bands are ¼ inch to 4 inches in thickness and from 1 to 4 inches apart. The underlying material, extending to a depth of 80 inches, is pale-brown fine sand.

Bloomfield soils are moderate in organic-matter content. The surface layer is medium acid unless limed. These soils are rapidly permeable and have a low available water capacity. Surface runoff is slow to rapid.

Erosion is a hazard, and the low available water capacity is a limitation in the use and management of these soils.

Representative profile of Bloomfield loamy fine sand, 6 to 12 percent slopes, in a cultivated field at a point 520 feet west and 320 feet south of the northeast corner of sec. 27, T. 4 N., R. 7 W.:

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) loamy fine sand; weak, medium, granular structure; very friable; neutral; abrupt, smooth boundary.

A2—10 to 27 inches, yellowish-brown (10YR 5/4) loamy fine sand; weak, fine, granular structure; very friable; medium acid; clear, wavy boundary.

A2&B2t—27 to 70 inches, yellowish-brown (10YR 5/4) fine sand and wavy, discontinuous bands of dark-brown (7.5YR 4/4) fine sandy loam and light sandy clay loam; bands are ¼ to 4 inches thick and 1 to 4 inches apart in upper part of horizon; they make up about half of horizon in lower part; textured bands have weak, medium, subangular blocky structure; very friable; fine sand is single grained; loose; medium acid in upper part becoming slightly acid in lower part; clear, wavy boundary.

C–70 to 80 inches, pale-brown (10YR 6/3) fine sand; single grained; loose; mildly alkaline.

The Ap horizon ranges from dark grayish brown to brown in color. The A2 horizon is loamy fine sand or fine sand. Depth to the A2 or B2t horizon ranges from 24 to 36 inches. The textural bands range from ¼ inch to 4 inches in thickness and from fine sandy loam to light sandy clay loam in texture. The A2 material between bands ranges from 2 to 12 inches in thickness.

The Bloomfield soils are similar to Princeton soils. They contain more sand than Princeton soils and lack a continuous textural B horizon.

Bloomfield loamy fine sand, 2 to 6 percent slopes (BlB).—This soil is on ridgetops and on short irregular slopes. Surface runoff is slow. Included with this soil in mapping are small areas of nearly level sandy soils.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grains, melons, alfalfa, and meadow. It also is well suited to apples and peaches. Erosion is a hazard, and the low available water capacity is a limitation. During years when rainfall is below average or poorly distributed, crops are

subject to severe damage from drought. (Capability unit IIIs–1; woodland suitability group 2s15)

Bloomfield loamy fine sand, 6 to 12 percent slopes (BlC).—This soil has short irregular slopes. It has the profile described as representative for the series. Surface runoff is medium. Included with this soil in mapping are small areas of eroded soils where the banded material is near the surface.

The soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, melons, alfalfa, and meadow. It also is well suited to apples and peaches.

Erosion is a hazard, and the low available water capacity is a limitation. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. (Capability unit IIIe–12; woodland suitability group 2s15)

Bloomfield loamy fine sand, 12 to 18 percent slopes (BlD).—This soil has short irregular slopes. Its profile is similar to that described as representative for the series, but it is 40 to 50 inches thick. Surface runoff is medium. Included with this soil in mapping are areas of eroded soils that have banded material near the surface.

This soil is suited to most crops commonly grown in the county. It is used mainly for small grains, meadow, pasture, orchards, and melons.

Erosion is a hazard, and the low available water capacity is a limitation. During the years of below-average or poorly distributed rainfall, crops are subject to severe damage from drought. (Capability unit IVe–12; woodland suitability group 2s15)

Bloomfield loamy fine sand, 18 to 35 percent slopes (BlF).—This soil has short irregular slopes on breaks and escarpments. Its profile is similar to that described as representative for the series, but it is mostly 35 to 45 inches thick. Surface runoff is rapid. Included with this soil in mapping are areas of eroded soils that have the banded material near the surface.

This soil is suited to permanent pasture or woodland.

Erosion is a hazard, and the low available water capacity is a limitation. In years when rainfall is below average or poorly distributed, pasture growth is poor. This soil needs protection from overgrazing to reduce the hazard of erosion. (Capability unit VIe–3; woodland suitability group 2s15)

Bonnie Series

The Bonnie series consists of deep, poorly drained soils that formed in alluvium on bottom lands. The native vegetation was water-tolerant trees.

In a representative profile, the surface layer is dark-gray silt loam about 8 inches thick. The subsoil, about 34 inches thick, is mottled, gray, friable silt loam that contains many black concretions. The underlying material, extending to a depth of about 60 inches, is mottled, gray and yellowish-brown heavy silt loam that contains thin lenses of silty clay loam.

Bonnie soils are moderate in organic-matter content. The surface layer is strongly acid unless limed. These soils are slowly permeable and have a high available water capacity. Surface runoff is very slow or ponded.

Wetness is a limitation and flooding is a hazard in the use and management of these soils. If drained, these soils are suited to most crops commonly grown in the county.

Representative profile of Bonnie silt loam in a cultivated field at a point 150 feet north and 50 feet west of the southeast corner of NE¼SE¼ sec. 19, T. 4 N., R. 5 W.:

Ap—0 to 8 inches, dark-gray (10YR 4/1) silt loam; moderate, medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

B21g—8 to 12 inches, grayish-brown (10YR 5/2) silt loam; common, fine, faint mottles of yellowish brown (10YR 5/4 and 5/6); weak, thick, platy structure; friable; very strongly acid; clear, smooth boundary.

B22g—12 to 30 inches, light-gray (10YR 7/2) silt loam (19 percent clay); common, fine, distinct mottles of yellowish brown (10YR 5/4); weak, fine, granular structure; friable; common brown and black iron and manganese oxide concretions; very strongly acid; diffused, wavy boundary.

B23g—30 to 42 inches, gray (5Y 6/1) silt loam (24 percent clay); many, medium, distinct mottles of dark yellowish brown (10YR 4/4); weak, fine, granular structure or massive; firm and slightly brittle; many iron and manganese oxide concretions; soft; medium acid; diffused, wavy boundary.

Cg—42 to 60 inches, mottled gray (10YR 6/1) and yellowish-brown (10YR 5/4) heavy silt loam and thin lenses of silty clay loam; massive; friable; slightly acid.

The Ap horizon ranges from dark gray to light brownish gray or grayish brown in color. In undisturbed areas a dark-gray or gray A1 horizon 2 to 4 inches thick is present. The B horizon ranges from grayish brown to light gray or gray and is mottled with brown and yellowish brown. It ranges from very strongly acid to medium acid. The C horizon ranges from strongly acid to slightly acid.

Bonnie soils are similar to Stendal and Wakeland soils. They differ from these soils in having a grayer profile and in being poorly drained. They differ from Wakeland soils because they are strongly acid.

Bonnie silt loam (0 to 2 percent slopes) (Bo).—This soil is in slightly depressional areas along creeks. Surface runoff is very slow or ponded. Included with this soil in mapping are small areas of somewhat poorly drained soils.

This soil is suited to most crops commonly grown in the county if it is protected from flooding and a suitable drainage system is established. It is used mainly for corn, soybeans, meadows, and pasture. Alfalfa and small grain are subject to severe damage from flooding in winter and early in spring. Wetness is a limitation, and flooding is a hazard. (Capability unit IIIw–10; woodland suitability group 2w11)

Cincinnati Series

The Cincinnati series consists of deep, well-drained, gently sloping to strongly sloping soils that formed in about 20 to 40 inches of loess and in material weathered from till on uplands. A firm and brittle fragipan is at a depth of about 25 inches. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is dark grayish-brown silt loam about 10 inches thick. The subsoil is about 75 inches thick. The upper 15 inches is dark-brown and yellowish-brown, firm light silty clay loam, and the lower 60 inches is a fragipan of yellowish-brown and brown, firm and brittle light silty clay loam and clay loam. The underlying material, extending to a depth of 110 inches, is brown loam.

Cincinnati soils are moderate in organic-matter content. They are very slowly permeable and have a low available water capacity. Surface runoff is medium or rapid.

Runoff and erosion are hazards and the very slowly permeable fragipan and moderate available water capacity are limitations in the use and management of these soils.

Representative profile of Cincinnati silt loam, 2 to 6 percent slopes, eroded, in a cultivated field facing southeast at a point 135 feet north and 15 feet west of the southeast corner of NE¼ sec. 32, T. 4 N., R. 5 W.:

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable; strongly acid; abrupt, smooth boundary.

B21t—10 to 20 inches, dark-brown (10YR 4/3) light silty clay loam; moderate, medium, subangular blocky structure; firm; thin, discontinuous, dark-brown (7.5YR 4/4) clay films on many faces of peds; extremely acid; clear, wavy boundary.

B22t—20 to 25 inches, yellowish-brown (10YR 5/4) light silty clay loam; moderate, medium, angular and subangular blocky structure; firm; thin dark-brown (7.5YR 4/4) clay films on many faces of peds; thin pale-brown (10YR 6/3) silt coatings on some faces of peds; extremely acid; abrupt, irregular boundary.

Bx1—25 to 36 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; many, medium, distinct mottles of light brownish gray (10YR 6/2); moderate to strong, coarse, prismatic structure parting to moderate, coarse, angular blocky structure; firm; brittle; thin to medium reddish-brown (5YR 4/4) and gray (10YR 5/1) clay films on all faces of peds; thin light-gray (10YR 7/2) silt coatings as cappings on prisms and as fillings in krotovinas and in some vertical crack fillings; very strongly acid; clear, wavy boundary.

IIBx2—36 to 58 inches, brown (10YR 5/3) light clay loam; common, medium, distinct mottles of light brownish gray (10YR 6/2); moderate to strong, coarse, prismatic structure; firm; brittle; thin to medium, dark-brown (7.5YR 4/4) and gray (10YR 5/1)) clay films on all prismatic faces; thin gray (10YR 6/1) silt coatings on many faces of peds and as krotovina fillings; very strongly acid; gradual, wavy boundary.

IIB23t—58 to 85 inches, dark-brown (7.5 4/4) silty clay loam; moderate to strong, fine and medium, angular blocky structure; firm to very firm; few pebbles; common, fine, distinct, gray (10YR 6/1) streaks of clay and silt; thin reddish-brown (5YR 4/4) clay films on all faces of peds; medium acid; gradual, wavy boundary.

IIC—85 to 110 inches, brown (10YR 5/3) loam; massive; friable; medium acid.

The Ap horizon ranges from dark grayish brown to brown in color. Depth to the fragipan is 15 to 30 inches. The fragipan ranges from 20 to 40 inches in thickness and from light silty clay loam to loam and from loam to clay loam in texture. The C horizon ranges from medium acid to mildly alkaline. The loess cap ranges from 10 to 40 inches in thickness.

Cincinnati soils are similar to Zanesville and Hosmer soils. They differ from Zanesville and Hosmer soils because they formed in loess and material weathered from till. They have a higher content of sand in the lower part of the profile than Hosmer soils and are less acid in the lower part of the profile than Zanesville soils.

Cincinnati silt loam, 2 to 6 percent slopes, eroded (CcB2).—This soil is on narrow ridgetops and on side slopes. It has the profile described as representative for the series. It has lost 4 to 6 inches of the original surface layer through erosion, and the plow layer is a mixture of the original surface layer and a moderate amount of the dark-brown subsoil. Runoff is medium. Included with this soil in mapping are a few small areas of severely eroded soils. Also included are a few small areas of soils that have slopes of more than 6 percent.

The soil is suited to most crops commonly grown in the county. Alfalfa and other deep-rooted crops do not grow well, however, because of the restricted root zone. Runoff and erosion are hazards, and the very slowly permeable fragipan and low available water capacity are limitations. During years of below-average or poorly distributed rainfall, crops are subject to damage from drought. Careful management is required to control erosion in cultivated fields. (Capability unit IIe–7; woodland suitability group 3d9)

Cincinnati silt loam, 6 to 12 percent slopes, eroded (CcC2).—This soil is on the sides of natural drainageways and on uniform slopes below ridgetops. It has a profile similar to that described as representative for the series, but 4 to 6 inches of its original surface layer has been removed by erosion. The plow layer is a mixture of the original surface layer and a moderate amount of the dark-brown subsoil. Runoff is medium. Included with this soil in mapping are a few areas of severely eroded soils.

This soil is suited to most crops commonly grown in the county. It is mainly used for corn, soybeans, small grain, meadow, and pasture. Alfalfa and other deep-rooted crops are not well suited, because the fragipan restricts the downward movement of roots. Runoff and erosion are hazards, and the very slowly permeable fragipan and low available water capacity are limitations. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. Careful management is required to control erosion in cultivated areas. (Capability unit IIIe–7; woodland suitability group 3d9)

Cincinnati silt loam, 6 to 12 percent slopes, severely eroded (CcC3).—This soil is on the sides of natural drainageways and on uniform slopes below ridgetops. It has a profile similar to that described as representative for the series, but the depth to the fragipan is 15 to 20 inches. This soil has lost from 6 inches to all of its original surface layer through erosion. The plow layer is mostly dark-brown material that formerly was subsoil. Surface runoff is rapid. Included with this soil in mapping are small areas of slightly eroded and moderately eroded soils.

This soil is suited to small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the downward movement of roots. Runoff and erosion are hazards, and the very slowly permeable fragipan and low available water capacity are limitations. During years of below-average or poorly distributed rainfall, crops are subject to damage from drought. The severe hazard of erosion limits the use of this soil for row crops. (Capability unit IVe–7; woodland suitability group 3d9)

Cincinnati silt loam, 12 to 18 percent slopes, eroded (CcD2).—This soil is on the sides of natural drainageways and on uniform slopes below ridgetops. It has a profile similar to that described as representative for the series, but the depth to the fragipan is 15 to 20 inches and the fragipan is less well developed. This soil has lost 3 to 5 inches of its original surface layer through erosion. The plow layer is a mixture of the original surface layer and a moderate amount of the dark-brown subsoil. Runoff is rapid. Included with this soil in mapping are small areas of slightly eroded soils in permanent pasture or woodland. Also included are a few small areas of severely eroded soils that have small gullies.

This soil is suited to small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the downward growth of roots is restricted by the

fragipan. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. (Capability unit IVe–7; woodland suitability group 3d9)

Cincinnati silt loam, 12 to 18 percent slopes, severely eroded (CcD3).—This soil is on the sides of natural drainageways. It has a profile similar to that described as representative for the series, but the depth to the fragipan is about 15 inches. This soil has lost from 6 inches to all of its original surface layer through erosion. The plow layer is mostly dark-brown subsoil material. Runoff is rapid. Included with this soil in mapping are a few small areas of slightly eroded and moderately eroded soils in woods or permanent pasture. Also included are small areas of deeply gullied soils.

This soil is suited to meadow and pasture. Alfalfa and other deep-rooted legumes do not grow well, however, because the fragipan restricts the downward movement of roots. Runoff and erosion are hazards, and the very slowly permeable fragipan and low available water capacity are limitations. The severe hazard of erosion limits the use of this soil for row crops. In years of below-average or poorly distributed rainfall, crops are subject to damage from drought. (Capability unit VIe–1; woodland suitability group 3d9)

Cuba Series

The Cuba series consists of deep, well-drained, nearly level soils that formed in alluvium on bottom lands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is dark grayish-brown silt loam about 9 inches thick. The subsoil is yellowish-brown, friable silt loam about 18 inches thick. The underlying material, extending to a depth of 60 inches, is yellowish-brown and brown silt loam underlain by yellowish-brown and grayish-brown, stratified loam and silt loam that contains thin lenses of sand.

Cuba soils are moderate in organic-matter content. The surface layer is strongly acid unless limed. These soils are moderately permeable and have a high available water capacity. Surface runoff is slow.

Flooding is the major hazard in the use and management of these soils. These soils are suited to most crops commonly grown in the county.

Representative profile of Cuba silt loam in a cultivated field at a point 300 feet north and 60 feet west of the southeast corner of sec. 14, T. 2 N., R. 5 W.:

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) to dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; medium acid; abrupt, smooth boundary.

B2—9 to 27 inches, yellowish-brown (10YR 5/4) silt loam; moderate, medium, granular structure; friable; strongly acid; clear, smooth boundary.

C1—27 to 33 inches, yellowish-brown (10YR 5/4) and brown (7.5YR 4/4) silt loam; few, fine, faint mottles of light brownish gray (10YR 6/2); friable; very strongly acid; clear, smooth boundary.

IIC2—33 to 60 inches, yellowish-brown (10YR 5/4) and grayish-brown (10YR 5/2) stratified loam and silt loam and thin lenses of sand; massive; friable; very strongly acid.

The Ap horizon ranges from dark grayish brown to brown in color. The B horizon ranges from dark brown to yellowish brown. A few faint mottles are below a depth of 24 inches in some areas. The C horizon is stratified and ranges from silt loam to fine sandy loam in texture; it is very strongly acid to medium acid.

Cuba soils are similar to Haymond soils, but, unlike those soils, they are strongly acid and very strongly acid.

Cuba silt loam (0 to 2 percent slopes) (Cu).—This soil is on bottom lands along small streams. Surface runoff is slow. Included with this soil in mapping are some areas of soils that are moderately well drained.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, meadow, and pasture. Small grain and alfalfa are subject to damage from flooding in winter and early in spring. Flooding is the major hazard in use and management. (Capability unit I–2; woodland suitability group 1o8)

Elston Series

The Elston series consists of deep, well-drained, nearly level soils that formed in about 5 feet of outwash materials on terraces. The native vegetation was prairie grasses.

In a representative profile, the surface layer is loam about 15 inches thick. It is very dark brown in the upper part and very dark gray to very dark brown in the lower part. The subsoil is about 41 inches thick. The upper 8 inches of the subsoil is brown, friable heavy loam; the next 13 inches is brown, firm light sandy clay loam; and the lower 20 inches is dark-brown, friable sandy loam. The underlying material, extending to a depth of 65 inches, is brown, stratified sand and sandy loam that contains thin lenses of gravel.

Elston soils are high in organic-matter content. The surface layer is medium acid unless limed. These soils are moderately permeable and have a moderate available water capacity. Surface runoff is slow.

The moderate available water capacity is the major limitation in the use and management of these soils. These soils are suited to all crops commonly grown in the county.

Representative profile of Elston loam in a cultivated field at a point 350 feet south and 25 feet east of the northwest corner of sec. 29, T. 4 N., R. 7 W.:

Ap—0 to 8 inches, very dark brown (10YR 2/2) loam; moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A1—8 to 15 inches, very dark gray (10YR 3/1) to very dark brown (10YR 2/2) loam; moderate, medium and coarse, granular structure; friable; medium acid; clear, smooth boundary.

B21t—15 to 23 inches, brown (10YR 4/3) heavy loam; weak to moderate, medium, subangular blocky structure; friable; thin, discontinuous, very dark grayish-brown (10YR 3/2) clay films and coatings on faces of peds; medium acid; clear, smooth boundary.

B22t—23 to 36 inches, brown (10YR 5/3) light sandy clay loam; moderate, medium, subangular blocky structure; firm; thin dark-brown (10YR 3/3) clay films on faces of peds; strongly acid; clear, smooth boundary.

B3—36 to 56 inches, dark-brown (7.5YR 4/4) sandy loam; weak, coarse, subangular blocky structure; friable; few, thin, brown (10YR 4/3) clay films on most faces of peds; strongly acid; clear, smooth boundary.

IIC—56 to 65 inches, brown (10YR 5/3), stratified sand and sandy loam and thin layers of gravelly sand and fine gravel; loose; friable; slightly acid.

The A horizon ranges from black to very dark gray or very dark brown in color and from 12 to 18 inches in thickness. The B horizon ranges from brown to dark yellowish brown or reddish brown in color and from sandy loam to sandy clay

loam or light clay loam in texture. The C horizon is medium acid or slightly acid in the upper part, becoming mildly alkaline with depth.

Elston soils are in close association with Lyles and Vincennes soils. They differ from Lyles soils because they are acid and are well drained. They differ from Vincennes soils because they are well drained and contain more sand.

Elston loam (0 to 2 percent slopes) (En).—This soil is on outwash terraces. It is moderately permeable, and its surface runoff is slow. Included with this soil in mapping are small areas of soils that have a fine sandy loam surface layer.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Some areas are used for grain sorghum. Irrigated vegetable crops, such as potatoes, tomatoes, and green beans, also are well suited. The moderate available water capacity is a limitation in use and management. In years of below-average rainfall or of poorly distributed rainfall, nonirrigated crops are subject to severe damage from drought. (Capability unit IIs–2; woodland suitability group o23)

Gilpin Series

The Gilpin series consists of moderately deep, well-drained, steep and very steep soils that formed in material weathered from shale, siltstone, and sandstone bedrock on uplands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is silt loam about 8 inches thick. The upper 2 inches of this layer is very dark grayish-brown, and the lower part is yellowish-brown. The subsoil is yellowish-brown, firm light silty clay loam and channery silty clay loam about 14 inches thick. The underlying material is brown and pale-brown loam and fine sandy loam. Fractured sandstone, siltstone, and shale are at a depth of about 30 inches.

Gilpin soils are low in organic-matter content. The surface layer is strongly acid. These soils are moderately permeable and have a moderate available water capacity. Surface runoff is very rapid.

Runoff and erosion are the major hazards in the use and management of these soils. These soils are suited to permanent vegetation.

Representative profile of Gilpin silt loam in an area of Gilpin-Berks complex, 25 to 50 percent slopes, 200 feet south and 140 feet east of the northwest corner of NE¼ sec. 15, T. 4 N., R. 5 W.:

O1—1 inch to 0, partly decomposed leaf litter.

A1—0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; about 10 percent weathered fragments, by volume; weak, fine, granular structure; friable; medium acid; abrupt, smooth boundary.

A2—2 to 8 inches, yellowish-brown (10YR 5/4) silt loam; 5 to 10 percent weathered fragments, by volume; weak, thin, platy structure; friable; very strongly acid; clear, smooth boundary.

B1t—8 to 14 inches, yellowish-brown (10YR 5/6) light silty clay loam; 5 to 10 percent sandstone fragments, by volume; moderate, fine and medium, subangular blocky structure; firm; few, thin, brown (7.5YR 4/4) clay films on some faces of peds; very strongly acid; clear, irregular boundary.

B2t—14 to 22 inches, yellowish-brown (10YR 5/6) channery silty clay loam; 10 to 20 percent weathered fragments, by volume; moderate, medium, subangular blocky structure; firm; few, thin, reddish-brown (5YR 5/4) clay films on some faces of peds; very strongly acid; abrupt, wavy boundary.

C—22 to 30 inches, brown (10YR 5/3) and pale-brown (10YR 6/3) loam and fine sandy loam; about 70 percent partially weathered fragments; massive; firm; very strongly acid.

R—30 inches, interbedded, fractured sandstone, siltstone, and shale bedrock.

The undisturbed A1 horizon ranges from dark gray to very dark grayish brown in color. The A horizon, if disturbed, is dark grayish brown, dark brown, or brown. The B horizon ranges from heavy silt loam to channery silty clay loam in texture. The content of coarse fragments in the B horizon is 10 to 30 percent. The B horizon ranges from 9 to 18 inches in thickness. Coarse fragments are fine-grained sandstone and siltstone. Depth to bedrock ranges from 20 to 36 inches.

Gilpin soils are similar to Wellston and Berks soils. They have a thinner profile than Wellston soils, and they have a finer textured B horizon than Berks soils.

Gilpin-Berks complex, 25 to 50 percent slopes (GbF).—This complex is made up of soils that formed in sandstone, siltstone, and shale bedrock on uplands. Gilpin silt loam makes up about 60 percent of this complex, and Berks channery silt loam makes up 40 percent. Each of these soils has the profile described as representative for its respective series. Included with this complex in mapping are small areas of nearly vertical escarpments where faces of sandstone bedrock are exposed.

These soils are suited to permanent vegetation. About 85 percent of the acreage in the complex is woodland. The remaining acreage is in permanent pasture or is idle. Runoff, erosion, and steep slopes are the major hazards. (Capability unit VIIe–1; woodland suitability group 3o10)

Haymond Series

The Haymond series consists of deep, well-drained, nearly level soils that formed in alluvium on bottom lands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is dark-brown silt loam about 8 inches thick. The subsoil is brown, friable silt loam about 22 inches thick. The underlying material, extending to a depth of 60 inches, is yellowish-brown silt loam.

Haymond soils are moderate in organic-matter content. The surface layer is slightly acid or neutral. These soils are moderately permeable and have a high available water capacity. Surface runoff is slow or very slow.

Flooding is the major hazard in the use and management of these soils.

Representative profile of Haymond silt loam in a cultivated field at a point 100 feet east and 25 feet north of the southwest corner of SE¼NW¼ sec. 5, T. 1 N., R. 7 W.:

Ap—0 to 8 inches, dark-brown (10YR 4/3) silt loam; weak medium, granular structure; friable; neutral, abrupt, smooth boundary.

B2—8 to 30 inches, brown (10YR 5/3) silt loam; weak, medium, subangular blocky structure; friable; few brown (10YR 4/3) coatings on some faces of peds; neutral; gradual, wavy boundary.

C—30 to 60 inches; yellowish-brown (10YR 5/4) silt loam; massive; firm; few light brownish-gray (10YR 6/2) coatings; neutral.

The Ap horizon ranges from dark grayish brown to brown in color and is slightly acid to neutral. The B horizon ranges from dark brown to yellowish brown. A few, faint mottles are below a depth of 30 inches in some areas. The C horizon ranges from silt loam to light loam in texture and contains lenses of sandy loam. It is slightly acid to weakly alkaline.

Haymond soils are similar to Cuba and Armiesburg soils. They are less acid than Cuba soils. They have a lighter colored surface layer than Armiesburg soils and formed in material containing more silt.

Haymond silt loam (0 to 2 percent slopes) (Hd).—This soil is on broad bottom lands. Surface runoff is slow. Included with this soil in mapping are small areas of moderately well drained soils. Also included are small areas of soils that have a loam surface layer.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn and soybeans. Alfalfa and small grain are subject to severe damage during periods of prolonged flooding. Flooding is the major hazard. Most areas along the West Fork of White River are protected by levees, but during periods of high water in winter and early in spring, seepage through levees causes some flooding. (Capability unit I–2; woodland suitability group 1o8)

Hickory Series

The Hickory series consists of deep, well-drained, moderately steep to very steep soils on uplands. These soils formed in material that weathered from till and that originally was covered with a mantle of loess less than 20 inches thick. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is pale-brown silt loam about 6 inches thick. The subsoil is about 42 inches thick. The upper 15 inches is light yellowish-brown and yellowish-brown, friable to firm silt loam and light clay loam, and the lower 27 inches is strong-brown, firm clay loam. The underlying material, extending to a depth of 60 inches, is grayish-brown light clay loam.

Hickory soils are low in organic-matter content. These soils are very strongly acid throughout. They are moderately permeable and have a high available water capacity. Surface runoff is rapid and very rapid.

Runoff and erosion are the major hazards in the use and management of these soils. These soils are suited to permanent pasture and woodland.

Representative profile of Hickory silt loam, 25 to 50 percent slopes, in a wooded area at a point 200 feet south and 625 feet east of the northwest corner of NE¼ sec. 10, T. 3 N., R. 5 W.:

O—½ inch to 0, partly decomposed leaf litter; very strongly acid.

A1—0 to 1 inch, very dark brown (10YR 2/2) silt loam; moderate, fine, granular structure; very friable; very strongly acid; abrupt, wavy boundary.

A2—1 to 6 inches, pale-brown (10YR 6/3) silt loam; moderate, thick, platy structure; very friable; abundant roots; common wormhole fillings of material from A1 horizon; very strongly acid; clear, smooth boundary.

B1—6 to 10 inches, light yellowish-brown (10YR 6/4) and yellowish-brown (10YR 5/4) silt loam; weak, fine and medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

B21t—10 to 21 inches, yellowish-brown (10YR 5/6) light clay loam; moderate, medium, subangular blocky structure; firm; few, thin, brown (10YR 5/3) clay films on most faces of peds; very strongly acid; clear, wavy boundary.

B22t—21 to 42 inches, strong-brown (7.5YR 5/6) clay loam; moderate, medium, subangular blocky structure; firm; thin brown (7.5YR 4/4) clay films on faces of peds; few light yellowish-brown (10YR 6/4) silt films on faces of peds and in crack fillings; strongly acid; gradual, smooth boundary.

B3t—42 to 48 inches, strong-brown (7.5YR 5/6) clay loam; weak, coarse, subangular blocky structure; firm; few black (10YR 2/1) manganese concretions; light-gray (10YR 7/2) silt coatings in crack fillings; medium acid; abrupt, smooth boundary.

C—48 to 60 inches, grayish-brown (2.5Y 5/2) light clay loam; massive; firm; few, medium, black (10YR 2/1) iron and manganese concretions; moderately alkaline.

In places the B1 horizon is silt loam and contains enough sand to have a gritty feel. The B2 horizon ranges from 30 to 50 inches in thickness and from strong brown to dark yellowish brown or yellowish brown in color. The C horizon ranges from loam to clay loam in texture. It is neutral to moderately alkaline.

Hickory soils are similar to Cincinnati and Negley soils. They differ from Cincinnati soils because they lack a fragipan. They have less sand in the B2 horizon than Negley soils; and they are underlain by loam and clay loam material, whereas the Negley soils are underlain by loose gravelly and sandy outwash material.

Hickory silt loam, 18 to 25 percent slopes, eroded (HkE2).—This soil is on the sides of natural drainageways. The slopes are short and irregular. Included with this soil in mapping are small areas of severely eroded soils. In areas that are associated with the Bartle and Peoga soils, which occur in old lakebeds, this soil is underlain by stratified silt loam and silty clay loam at a depth of 50 to 60 inches.

Because of steep slopes and the severe hazard of erosion, this soil is better suited to permanent pasture or woodland than to most other uses. Runoff and erosion are the major hazards. (Capability unit VIe–1; woodland suitability group 1r2)

Hickory silt loam, 25 to 50 percent slopes (HkF).—This soil has short, irregular slopes on the sides of natural draws and escarpments. It has the profile described as representative for the series. Included with this soil in mapping are small areas of moderately eroded soils. In areas that are associated with the Bartle and Peoga soils, which are in old lakebeds, this soil is underlain by stratified silt loam and silty clay loam at a depth of 50 to 60 inches.

This soil is better suited to permanent pasture or woodland than to most other uses because it is steep or very steep and highly susceptible to erosion. Runoff and erosion are the major hazards. (Capability unit VIIe–1; woodland suitability group 1r2)

Hosmer Series

The Hosmer series consists of deep, well-drained, nearly level to strongly sloping soils that formed in 4 to 8 feet of loess over sandstone and shale bedrock, Illinoian till, or stratified lake sediments on uplands. A firm and brittle fragipan is at a depth of about 30 inches. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is brown silt loam about 12 inches thick (fig. 11). The subsoil is brown and yellowish brown and is about 50 inches thick. The upper 21 inches of the subsoil is friable to firm silt loam and light silty clay loam, and the lower 28 inches is a firm and brittle silt loam fragipan. The underlying material, extending to a depth of 100 inches, is brown silt loam.

Hosmer soils are low in organic-matter content. The surface layer is strongly acid unless limed. These soils are very slowly permeable and have a moderate available water capacity. Surface runoff is slow to rapid.

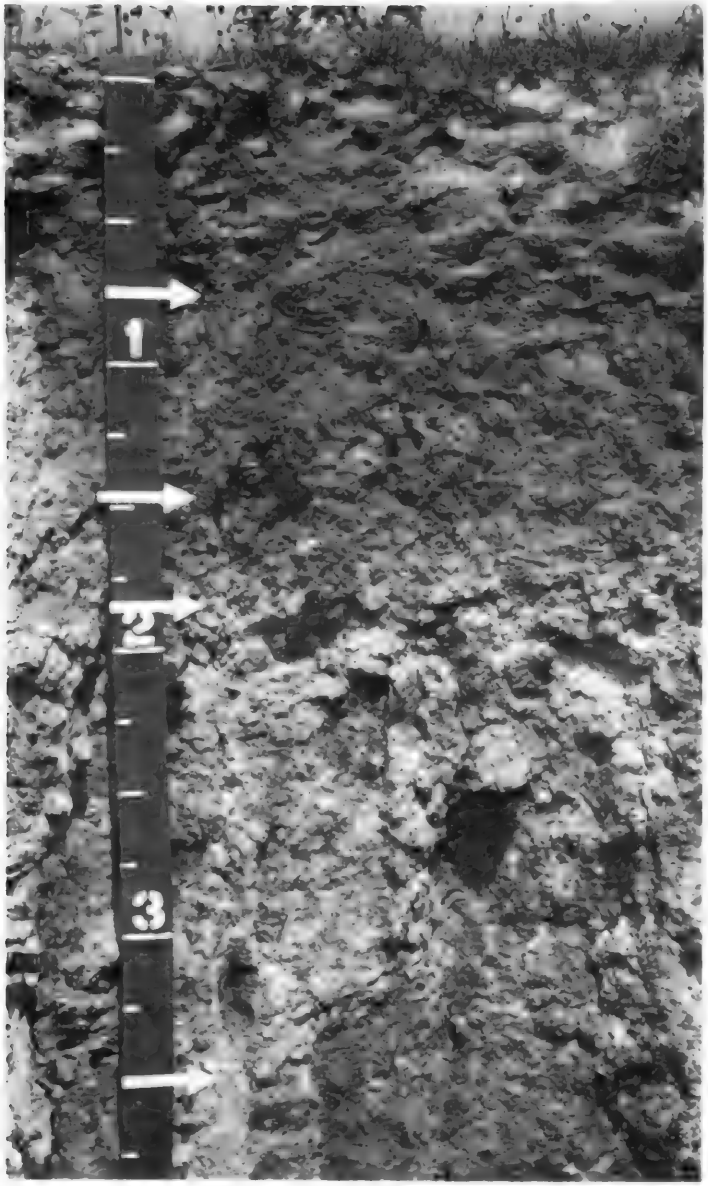

Figure 11.—Profile of a Hosmer silt loam.

Runoff and erosion are hazards where slopes are more than 2 percent. The very slowly permeable fragipan and moderate available water capacity are limitations in the use and management of these soils.

Representative profile of Hosmer silt loam, 2 to 6 percent slopes, eroded, in a cultivated field at a point 165 feet west and 50 feet north of the southeast corner of SW¼ NE¼ sec. 21, T. 2 N., R. 7 W.:

Ap—0 to 12 inches, brown (10YR 5/3) silt loam; moderate, medium, granular structure; friable; very strongly acid; abrupt, smooth boundary.

B1—12 to 17 inches, dark-brown (7.5YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

B21t—17 to 27 inches, strong-brown (7.5YR 5/6) light silty clay loam; moderate, medium, subangular blocky structure; firm; thin dark-brown (7.5YR 4/4) clay films on most faces of peds; very strongly acid; clear, smooth boundary.

B22t—27 to 33 inches, yellowish-brown (10YR 5/4) light silty clay loam; moderate, medium, subangular blocky structure; firm; thin dark-brown (7.5YR 4/4) clay films on many faces of peds; thin, discontinuous, brown (10YR 5/3) silt coatings; common, soft, black iron and manganese oxide accumulations; very strongly acid; abrupt, irregular boundary.

Bx—33 to 62 inches, brown (10YR 5/3) and yellowish-brown (10YR 5/4) heavy silt loam; many, medium, distinct mottles of gray (10YR 6/1 or 5/1); moderate, very coarse, prismatic structure parting to coarse, angular blocky structure; firm and fragile (brittle); thin grayish-brown (10YR 5/2) clay films on faces of peds; light-gray (10YR 7/2) silt coatings as cappings on prismatic heads and fills between peds; thickness ranges from 0.1 inch to 1.5 inches; vertical silty clay loam streaks as much as 0.4 inch wide; numerous, soft, black iron and manganese accumulations; very strongly acid; gradual, wavy boundary.

C1—62 to 98 inches, brown (10YR 5/3) silt loam; common, fine, distinct mottles of light brownish gray (10YR 6/2); massive; friable; strongly acid; clear, wavy boundary.

IIC2—98 to 100 inches, brown (10YR 5/3) clay loam; massive; friable; slightly acid.

The Ap horizon ranges from dark grayish brown to grayish brown or brown in color. The B2 horizon ranges from dark brown to yellowish brown. The fragipan ranges from 24 to 36 inches in thickness. Depth to the fragipan layer is 14 to 36 inches. The C1 horizon is silt loam and ranges from strongly acid to slightly acid.

Hosmer soils are similar to Cincinnati and Alford soils. They have less sand in the lower part of the profile than Cincinnati soils. They differ from Alford soils because they are more acid and have a fragipan.

Hosmer silt loam, 0 to 2 percent slopes (HoA).—This soil is on ridgetops and in small areas near the heads of drainageways. It has a profile similar to that described as representative for the series, but it has a dark grayish-brown surface layer. Surface runoff is slow. Included with this soil in mapping are small areas of moderately well drained soils. Also included are a few small areas of soils having slopes of more than 2 percent. Where this soil is associated with Bartle and Peoga soils, which are in old lakebeds, it is underlain by stratified silt loam and silty clay loam at a depth of 60 to 80 inches.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the downward movement of roots. The very slowly permeable fragipan and the moderate available water capacity are limitations. Wetness early in spring caused by perching of water above the fragipan commonly results in some delay of farming operations. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. (Capability unit IIw-5; woodland suitability group 3d9)

Hosmer silt loam, 2 to 6 percent slopes, eroded (HoB2).—This soil is on ridgetops and side slopes. It has the profile described as representative for the series. This soil has lost 4 to 6 inches of its original surface layer through erosion, and the plow layer is a mixture of the original surface layer and a moderate amount of the dark-brown subsoil. Runoff is medium. Included with this soil in mapping are small areas of moderately well drained soils. Also included are small areas of nearly level and moderately sloping soils. Where this soil is associated with Bartle and Peoga soils, which are in old lakebeds, it is

underlain by stratified silt loam and silty clay loam at a depth of 60 to 80 inches.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Alfalfa and other deep-rooted crops are not well suited, because the downward growth of their roots is restricted by the fragipan. Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations. During years of below-average or poorly distributed rainfall, crops are subject to damage from drought. (Capability unit IIe–7; woodland suitability group 3d9)

Hosmer silt loam, 2 to 6 percent slopes, severely eroded (HoB3).—This soil is on the sides of natural draws and on side slopes below ridgetops. It has a profile similar to that described as representative for the series, but it has had from 6 inches to all of the original surface layer removed through erosion. The plow layer is mostly material that formerly was dark-brown subsoil. Runoff is rapid. Included with this soil in mapping are a few small areas of eroded soils. Also included are small areas that have slopes of more than 6 percent. Where this Hosmer soil is associated with Bartle and Peoga soils, which occur in old lakebeds, it is underlain by stratified silt loam and silty clay loam at a depth of 60 to 80 inches.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the downward movement of roots. Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations. A seedbed is more difficult to prepare on this soil than on the moderately eroded soils, and this generally results in poorer stands. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. (Capability unit IIIe–7; woodland suitability group 3d9)

Hosmer silt loam, 6 to 12 percent slopes, eroded (HoC2).—This soil is on the sides of natural draws and on uniform slopes below ridgetops. It has a profile similar to that described as representative for the series, but the depth to the fragipan ranges from 25 to 27 inches. From 4 to 6 inches of the original surface layer has been removed through erosion, and the plow layer is a mixture of the original surface layer and a moderate amount of the dark-brown subsoil. Runoff is medium. Included with this soil in mapping are a few small areas of slightly eroded soils and a few areas of soils that have slopes of more than 12 percent. Where this Hosmer soil is associated with Bartle and Peoga soils, which are in old lakebeds, it is underlain by stratified silt loam and silty clay loam at a depth of 60 to 80 inches.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the downward movement of roots. Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations. During years of below-average or poorly distributed rainfall, crops are subject to damage from drought. (Capability unit IIIe–7; woodland suitability group 3d9)

Hosmer silt loam, 6 to 12 percent slopes, severely eroded (HoC3).—This soil is on the sides of natural draws and on uniform slopes below ridgetops. It has a profile similar to that described as representative for the series, but the depth to the fragipan ranges from 24 to 27 inches and the combined surface layer and subsoil are slightly thinner. This soil has lost from 6 inches to all of the original surface layer through erosion, and the plow layer is mostly material from the dark-brown subsoil. Runoff is rapid. Included with this soil in mapping are a few small areas of eroded soils. Also included are small areas of soils with slopes of more than 12 percent. Where this Hosmer soil is associated with Bartle and Peoga soils, which occur in old lakebeds, it is underlain by stratified silt loam and silty clay loam at a depth of 60 to 80 inches.

This soil is suited to small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the downward movement of roots. Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations. Seedbeds commonly work up cloddy, and this results in poorer stands than on the uneroded soils. The severe risk of erosion limits use for row crops. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. (Capability unit IVe–7; woodland suitability group 3d9)

Hosmer silt loam, 12 to 18 percent slopes, eroded (HoD2).—This soil is on the sides of natural draws and on uniform slopes below ridgetops. It has a profile similar to that described as representative for the series, but the depth to the fragipan is 16 to 22 inches. This soil has lost 3 to 5 inches of the original surface layer through erosion, and the plow layer is a mixture of the original surface layer and a moderate amount of the subsoil. Runoff is rapid. Included with this soil in mapping are minor areas of slightly eroded soils in permanent pasture or woodland. Also included are small areas of severely eroded soils. Where this Hosmer soil is associated with Bartle and Peoga soils, which occur in old lakebeds, it is underlain by stratified silt loam and silty clay loam at a depth of 60 to 80 inches.

This soil is suited to small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the downward movement of roots. The severe risk of erosion limits use for row crops. Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. (Capability unit IVe–7; woodland suitability group 3d9)

Hosmer silt loam, 12 to 18 percent slopes, severely eroded (HoD3).—This soil is on the sides of natural draws and slopes below ridgetops. It has a profile similar to that described as representative for the series, but it is severely eroded and the depth to the fragipan is 14 to 20 inches. This soil has lost from 6 inches to all of the original surface layer through erosion. The plow layer is mostly material from the brown subsoil. Runoff is very rapid. Included with this soil in mapping are a few small areas of slightly eroded soils in permanent pasture or woodland. Many small gullies cross areas of this soil. Where this soil is associated with Bartle and Peoga soils, which occur in old lakebeds, it is underlain by stratified silt loam and silty clay loam at a depth of 60 to 80 inches.

This soil is suited to meadow and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the downward movement of roots. The severe risk of erosion limits use for row crops. Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations. Seedbeds commonly work up cloddy, and this results in poorer stands. During years of below-average or poorly distributed rainfall, crops are subject to damage from drought. (Capability unit VIe-1; woodland suitability group 3d9)

Iona Series

The Iona series consists of deep, moderately well drained, nearly level and gently sloping soils that formed in more than 5 feet of loess on uplands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsoil is about 38 inches thick. The upper 3 inches of the subsoil is brown, friable light silty clay loam, and the lower 35 inches is mottled, yellowish-brown, firm silty clay loam and light yellowish-brown and brownish-yellow silt loam. The underlying material, extending to a depth of 60 inches, is light yellowish-brown and brownish-yellow silt loam.

Iona soils are moderate in organic-matter content. The surface layer is medium acid unless limed. These soils are moderately slowly permeable and have a high available water capacity. Surface runoff is slow or medium.

Runoff and erosion are hazards on the gently sloping soils. On the nearly level soils, runoff and erosion are only slight hazards. These soils are suited to all crops commonly grown in the county.

Representative profile of Iona silt loam, 0 to 2 percent slopes, in a cultivated field at a point 1,270 feet west and 50 feet north of the southeast corner of sec. 8, T. 4 N., R. 6 W.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

B1t—8 to 11 inches, brown (10YR 5/3) light silty clay loam; moderate, fine, subangular blocky structure; friable; gray (10YR 6/1) and light brownish-gray (10YR 6/2) silt coatings in cracks and on faces of peds; medium acid; clear, smooth boundary.

B21t—11 to 21 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, faint mottles of pale brown (10YR 6/3); moderate, medium, angular and subangular blocky structure; firm; few, thin, dark-brown (10YR 3/3) clay films on faces of peds and in old root channels; light brownish-gray (10YR 6/2) silt coatings and streaks; medium acid; clear, smooth boundary.

B22t—21 to 32 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, distinct mottles of brownish yellow (10YR 6/8) and grayish brown (10YR 5/2); moderate, medium and coarse, subangular blocky structure; firm; brown (10YR 4/3) clay films on most faces of peds; light-gray (10YR 7/1) silt streaks and coatings in vertical crack fillings; common black (10YR 2/1) iron and manganese concretions; strongly acid in upper part, grading to slightly acid in lower part; gradual, wavy boundary.

B3—32 to 46 inches, light yellowish-brown (10YR 6/4) and brownish-yellow (10YR 6/6) silt loam; common, fine, distinct mottles of grayish brown (10YR 5/2); weak, coarse, subangular blocky structure; friable; few, thin, brown (10YR 4/3) clay films in root channels and on faces of peds; common, medium, black (10YR 2/1) iron and manganese concretions; neutral; clear, wavy boundary.

C—46 to 60 inches, light yellowish-brown (10YR 6/4) and brownish-yellow (10YR 6/6) silt loam; massive; friable; moderately alkaline (calcareous).

The Ap horizon ranges from dark grayish brown to brown in color. The B2 horizon ranges from dark yellowish brown, brown, or light yellowish brown in color and contains grayish-brown mottles in the lower part. Depth to mottles is 12 to 24 inches. The depth to the calcareous C horizon ranges from 40 to 60 inches.

Iona soils are similar to Alford and Hosmer soils. They are less acid than Alford and Hosmer soils, and they lack the fragipan of Hosmer soils.

Iona silt loam, 0 to 2 percent slopes (IoA).—This soil is on short narrow ridges in association with somewhat poorly drained soils. It has the profile described as representative for the series. Surface runoff is slow. Included with this soil in mapping are small areas of soils that have slopes of 3 percent.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. This soil has no serious hazards. (Capability unit I-1; woodland suitability group 1o1)

Iona silt loam, 2 to 6 percent slopes, eroded (IoB2).—This soil is on narrow ridges and on side slopes. It has a profile similar to that described as representative for the series, but it has lost 2 to 4 inches of its original surface layer through erosion. The plow layer is a mixture of the original surface layer and a moderate amount of the brown subsoil. Surface runoff is medium. Included with this soil in mapping are a few small areas of severely eroded soils.

This soil is well suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Erosion and runoff are the major hazards. (Capability unit IIe-3; woodland suitability group 1o1)

Iva Series

The Iva series consists of deep, somewhat poorly drained, nearly level and gently sloping soils that formed in more than 6 feet of loess on uplands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is grayish-brown silt loam about 7 inches thick. The subsurface layer is mottled, light brownish-gray silt loam about 4 inches thick. The subsoil is about 29 inches thick. The upper 7 inches of the subsoil is mottled, light brownish-gray, friable silt loam; the next 11 inches is mottled, yellowish-brown, firm silty clay loam; and the lower 11 inches is mottled, light brownish-gray, firm light silty clay loam. The underlying material, extending to a depth of 60 inches, is mottled, light yellowish-brown silt loam.

Iva soils are low in organic-matter content. The surface layer is medium acid unless limed. These soils are slowly permeable and have a high available water capacity. Surface runoff is slow to medium.

Wetness is the major limitation in the use and management of these soils. These soils are suited to all crops commonly grown in the county if a suitable drainage system is established and maintained.

Representative profile of Iva silt loam, 0 to 2 percent slopes, in a cultivated field at a point 160 feet east and 650

feet north of the southwest corner of sec. 20, T. 2 N., R. 6 W.:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) silt loam; moderate, fine and medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

A2—7 to 11 inches, light brownish-gray (10YR 6/2) silt loam; few, medium, distinct mottles of light yellowish brown (10YR 6/4); moderate, medium and thick, platy structure; friable; slightly acid; clear, wavy boundary.

B1g—11 to 18 inches, light brownish-gray (10YR 6/2) silt loam; common, distinct mottles of light yellowish brown (10YR 6/4); moderate, medium, subangular blocky structure; friable; few, small, very dark grayish-brown stains; medium acid; clear, smooth boundary.

B21tg—18 to 29 inches, yellowish-brown (10YR 5/4) silty clay loam; many, distinct mottles of light brownish gray (10YR 6/2); moderate, medium, subangular blocky structure; firm; thin gray (10YR 5/1) clay films on all faces of peds and crack fillings; few very dark brown (10YR 2/2) iron and manganese concretions; medium acid; gradual, wavy boundary.

B22tg—29 to 40 inches, light brownish-gray (10YR 6/2) light silty clay loam; many, coarse, distinct mottles of pale brown (10YR 6/3) and brownish yellow (10YR 6/6); weak, medium and coarse, subangular blocky structure; firm; few, small, dark-brown (10YR 3/3) iron and manganese concretions; thin light-gray (10YR 7/2) silt and clay films on some faces of peds and crack fillings; medium acid in upper part and slightly acid in lower part; gradual, smooth boundary.

C—40 to 60 inches, light yellowish-brown (10YR 6/4) silt loam; many, medium, distinct mottles of yellowish brown (10YR 5/4); massive; friable; gray (10YR 6/1) and light brownish-gray (10YR 6/2) streaks; slightly acid.

The Ap horizon ranges from dark grayish brown to light brownish gray and from medium acid to neutral. Depth to mottling ranges from 6 to 15 inches. The B2 horizon ranges from light silty clay loam to silty clay loam and from strongly acid to slightly acid in the lower part. The B2 horizon is dominantly subangular blocky in structure, but in some areas the structure is weak, medium, prismatic parting to subangular blocky. The profile ranges from 36 to 50 inches in thickness. The C horizon is medium acid to neutral.

Iva soils are similar to Reesville and Ayrshire soils. They have a thicker profile than Reesville soils and contain less sand in the profile than Ayrshire soils.

Iva silt loam, 0 to 2 percent slopes (IvA).—This soil is on broad flats on uplands. It has the profile described as representative for the series. Surface runoff is slow. Included with this soil in mapping are small areas of gently sloping soils around small natural drainageways.

This soil is suited to all crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, meadow, and pasture. Wetness is the major limitation. (Capability unit IIw–2; woodland suitability group 3w5)

Iva silt loam, 2 to 4 percent slopes, eroded (IvB2).—This soil is on ridges and on side slopes adjacent to drainageways. The plow layer consists mostly of the original surface layer but contains a small amount of the light brownish-gray subsoil. Runoff is medium. Included with this soil in mapping are small areas of moderately well drained soils.

This soil is suited to all crops commonly grown in the county if a suitable drainage system and erosion control practices are established and maintained. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Wetness is a limitation, and erosion is a hazard. (Capability unit IIe–12; woodland suitability group 3w5)

Kings Series

The Kings series consists of deep, very poorly drained soils that formed in fine-textured, water-deposited sediments in depressions on old glacial lakebeds. The native vegetation was swamp forest and marsh grasses.

In a representative profile, the surface layer is silty clay about 13 inches thick. The upper 5 inches of this layer is black, and the lower part is very dark gray. The subsoil is mottled, dark-gray, very firm heavy silty clay about 29 inches thick. The underlying material, extending to a depth of 60 inches, is mottled, gray heavy silty clay loam.

Kings soils are high in organic-matter content. The surface layer is neutral. These soils are very slowly permeable and have a high available water capacity. Surface runoff is very slow or ponded.

Wetness is the major limitation in the use and management of these soils. These soils are suited to most crops commonly grown in the county if a suitable drainage system is established and maintained.

Representative profile of Kings silty clay in a cultivated field at a point 250 feet south and 150 feet west of the northeast corner of NW¼NW¼ sec. 3, T. 4 N., R. 6 W.:

Ap—0 to 5 inches, black (10YR 2/1) silty clay; weak, fine, granular structure to somewhat massive, fine clods; firm; neutral; abrupt, smooth boundary.

A1—5 to 13 inches, very dark gray (N 3/0) silty clay; few, fine, distinct mottles of dark yellowish brown (10YR 4/4); moderate, fine, angular blocky structure; very firm; many slickenside faces ½ to 1 inch across; neutral; clear, smooth boundary.

B21g—13 to 20 inches, dark-gray (N 4/0) heavy silty clay; common, fine, distinct mottles of strong brown to dark brown (7.5YR 5/6 to 4/4); moderate, medium to coarse, angular blocky structure; very firm; distinct slickenside faces, up to 6 inches across, oriented approximately 45° to the horizontal; diffuse tubular tongues of dark-gray heavy silty clay, 1 to 2 inches in diameter and 6 to 12 inches apart, extend vertically through horizon; neutral; gradual, smooth boundary.

B22g—20 to 30 inches, dark-gray (N 4/0) heavy silty clay; common, fine, distinct mottles of strong brown (7.5YR 5/6); weak, medium, prismatic structure parting to moderate to strong, coarse, angular blocky structure, and the coarse peds part to fine to medium, angular blocky structure; very firm; distinct slickenside faces, ½ to 2 inches across, oriented approximately 30° to the horizonal; diffuse tubular tongues of dark-gray heavy silty clay loam, 1 to 2 inches in diameter and 6 to 12 inches apart, extend vertically through horizon; neutral; gradual, wavy boundary.

B3g—30 to 42 inches, gray (N 5/0) heavy silty clay; few, fine, distinct mottles of dark yellowish brown (10YR 4/4); weak, medium, prismatic structure parting to moderate, fine, angular blocky structure; very firm; distinct slickenside faces, ½ to 2 inches across, that has orientation ranging from horizontal to vertical; diffuse tubular tongues of dark-gray (N 4/0) heavy silty clay, 1 to 2 inches in diameter and 6 to 12 inches apart, extend vertically through horizon; neutral; gradual, wavy boundary.

Cg—42 to 60 inches, gray (N 5/0) heavy silty clay loam; common, fine, distinct mottles of dark brown (7.5YR 4/4) inside peds and few, fine, faint mottles on gray faces of peds; weak, coarse, prismatic structure parting to weak, coarse, angular blocky structure; very firm, diffuse tubular tongues of dark-gray (N 4/0) silty clay, 1 to 2 inches in diameter and 6 to 12 inches apart, extend vertically into horizon; mildly alkaline.

The total thickness of the A horizon ranges from 11 to 20 inches. Tubular tongues of dark-gray heavy silty clay loam

range from 1 to 2 inches in thickness and are spaced 6 to 12 inches apart. Depth to the C horizon ranges from 36 to 50 inches.

Kings soils are similar to Montgomery soils. They differ from Montgomery soils because they have a grayer B horizon and occupy the lower depressions.

Kings silty clay (0 to 2 percent slopes) (Kn).—This soil is in depressions on old glacial lakebeds.

This soil is suited to most crops commonly grown in the county if an adequate drainage system is established and maintained. It is used mainly for corn, soybeans, and meadow. Small grain is subject to damage from the high water table during winter and early in spring. Wetness is the major limitation. Maintaining good tilth is a concern of management. If the soil is tilled when wet, it becomes cloddy and hard to work. (Capability unit IIIw-2; woodland suitability group 2w11)

Lyles Series

The Lyles series consists of deep, very poorly drained, nearly level soils that formed in water- and wind-deposited sands and coarse silt in depressions on uplands and terraces. The native vegetation was marsh grasses and swamp forest.

In a representative profile, the surface layer is very dark brown fine sandy loam about 14 inches thick. The subsoil is about 42 inches thick. The upper 8 inches of the subsoil is mottled, dark-gray, friable fine sandy loam; the middle part is mottled, dark-gray, firm sandy clay loam and light sandy clay loam; and the lower 9 inches is gray and dark yellowish-brown, friable sandy loam. The underlying material, extending to a depth of 60 inches, is mottled gray, light brownish-gray, and dark yellowish-brown, stratified fine silt loam and loam.

Lyles soils are high in organic-matter content. The surface layer is slightly acid or neutral. These soils are moderately permeable and have a high available water capacity. Surface runoff is very slow.

Wetness is the major limitation in the use and management of these soils. These soils are suited to all crops commonly grown in the county if a suitable drainage system is established and maintained.

Representative profile of Lyles fine sandy loam in a cultivated field at a point 300 feet north and 100 feet west of the southeast corner of NW¼SW¼ sec. 4, T. 3 N., R. 7 W.:

Ap—0 to 8 inches, very dark brown (10YR 2/2) fine sandy loam; weak, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A1—8 to 14 inches, very dark brown (10YR 2/2) fine sandy loam; weak, medium, granular structure; friable; neutral; clear, smooth boundary.

B1g—14 to 22 inches, dark-gray (10YR 4/1) fine sandy loam; common, fine, distinct mottles of dark yellowish brown (10YR 4/4) and light brownish gray (10YR 6/2); weak, medium, subangular blocky structure; friable; neutral; clear, smooth boundary.

B21g—22 to 39 inches, dark-gray (10YR 4/1) sandy clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/8) and light brownish gray (10YR 6/2); very weak, medium, prismatic structure parting to moderate, medium, subangular blocky structure; firm; few, thin, very dark gray (10YR 3/1) stains or clay films on faces of peds; neutral; clear, smooth boundary.

B22g—39 to 47 inches, dark-gray (10YR 4/1) light sandy clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/6 or 5/8) and light brownish gray (10YR 6/2); weak, coarse, subangular blocky structure; firm; few, thin, discontinuous, gray (10YR 5/1) clay films on faces of peds; neutral; gradual, smooth boundary.

B3g—47 to 56 inches, gray (10YR 5/1) and dark yellowish-brown (10YR 4/4) sandy loam; very weak, coarse, subangular blocky structure; friable; neutral; gradual, diffuse boundary.

Cg—56 to 60 inches, mottled gray (10YR 5/1), light brownish-gray (10YR 6/2), and dark yellowish-brown (10YR 4/4), stratified fine sand and minor layers of silt loam and loam; friable; massive; mildly alkaline.

The A horizon ranges from very dark gray to black in color. The Bg horizon ranges from sandy loam to light clay loam in texture.

Lyles soils are similar to Ragsdale and Vincennes soils, but they have a sandier profile than those soils.

Lyles fine sandy loam (0 to 2 percent slopes) (Ls).—This soil is in depressions on uplands and terraces surrounded by sandy soils. It has the profile described as representative for the series. Surface runoff is very slow. Included with this soil in mapping are small areas of soils that have a loam surface layer.

This soil is suited to all crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Wetness is the major limitation. (Capability unit IIw-1; woodland suitability group 2w11)

Lyles loam (0 to 2 percent slopes) (Ly).—This soil is in depressions on uplands and terraces. It has a profile similar to that described as representative for the series, but it has a loam surface layer and a higher clay content in the subsoil. Surface runoff is very slow. Included with this soil in mapping are small areas of soils in terrace positions that have a silty clay loam surface layer and a sandy clay loam subsoil.

This soil is suited to all crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Wetness is the major limitation. (Capability unit IIw-1; woodland suitability group 2w11)

Markland Series

The Markland series consists of deep, well-drained, gently sloping to strongly sloping soils that formed in lacustrine material on terraces. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is brown silt loam about 7 inches thick. The subsoil is yellowish-brown and dark yellowish-brown, very firm light silty clay and silty clay about 29 inches thick. The underlying material, extending to a depth of 60 inches, is yellowish-brown silty clay that contains pockets and lenses of silt.

Markland soils are low in organic-matter content. The surface layer is strongly acid unless limed. These soils are slowly permeable and have a high available water capacity. Surface runoff is medium or rapid.

Runoff and erosion are the major hazards in the use and management of these soils. Markland soils are suited to most crops commonly grown in the county.

Representative profile of Markland silt loam, 2 to 6 percent slopes, eroded, in a cultivated field at a point 300

feet west and 10 feet north of the southeast corner of sec. 27, T. 2 N., R. 7 W.:

Ap—0 to 7 inches, brown (10YR 5/3) silt loam; moderate, fine and medium, granular structure; friable; neutral; abrupt, smooth boundary.

B21t—7 to 12 inches, yellowish-brown (10YR 5/4) light silty clay; moderate, fine and medium, angular blocky structure; very firm; few, thin, brown (10YR 5/3) coatings on some faces of peds; medium acid; clear, smooth boundary.

B22t—12 to 19 inches, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/4) silty clay; moderate, medium, angular blocky structure; very firm; thin, dark-brown (10YR 4/3) clay films on all faces of peds; strongly acid; clear, smooth boundary.

B23t—19 to 33 inches, dark yellowish-brown (10YR 4/4) silty clay; weak, coarse, prismatic structure parting to moderate, medium and coarse, blocky structure; very firm; dark-brown (10YR 4/3) clay films on faces of peds; grayish-brown (10YR 5/2) and pale-brown (10YR 6/3) silt coatings in old root channels and on some faces of peds; strongly acid; clear, wavy boundary.

B24t—33 to 36 inches, dark yellowish-brown (10YR 4/4) silty clay; moderate, medium, prismatic structure parting to moderate, medium, subangular blocky structure; firm; thick, dark grayish-brown (10YR 4/2) clay films on all faces of peds; light brownish-gray (10YR 6/2) and pale-brown (10YR 6/3) silt coatings on crack fillings and on some faces of peds; neutral; clear, wavy boundary.

C—36 to 60 inches, yellowish-brown (10YR 5/4) silty clay stratified with thin lenses and pockets of silt; common, medium, distinct mottles of light brownish gray (10YR 6/2) and pale brown (10YR 6/3); massive; firm; thin brownish clay films in crack fillings; many white (10YR 8/1) lime concretions; moderately alkaline.

The Ap horizon ranges from dark grayish brown to yellowish brown in color. The B horizon ranges from heavy silty clay loam to clay in texture. The depth to the C horizon ranges from 28 to 44 inches.

Markland soils are similar to Alford soils in natural drainage. They differ from Alford soils because they have a clayey profile and formed in lake-laid deposits.

Markland silt loam, 2 to 6 percent slopes, eroded (MaB2).—This soil is on the sides and at the heads of natural drainageways adjacent to nearly level, somewhat poorly drained McGary soils. It has the profile described as representative for the series. Surface runoff is medium. Included with this soil in mapping are small areas of soils that are severely eroded. In these severely eroded soils, the plow layer is mostly light yellowish-brown light silty clay.

This soil is suited to corn, soybeans, small grain, meadow, and pasture. Runoff and erosion are the major hazards. (Capability unit IIIe–11; woodland suitability group 3r18)

Markland silt loam, 6 to 18 percent slopes, eroded (MaD2).—This soil is on the sides of drainageways and on short slopes on breaks adjacent to nearly level, somewhat poorly drained McGary soils. It has a profile similar to that described as representative for the series, but it has lost 4 to 6 inches of the original surface layer through erosion. The plow layer is a mixture of the original surface layer and a moderate amount of the yellowish-brown subsoil. Surface runoff is medium or rapid. Included with this soil in mapping are small areas of severely eroded soils.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Runoff and erosion are the major hazards. (Capability unit IVe–11; woodland suitability group 3r18)

McGary Series

The McGary series consists of deep, somewhat poorly drained, nearly level soils that formed in lacustrine material on terraces. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is grayish-brown silt loam about 6 inches thick. The subsurface layer is mottled, light brownish-gray silt loam about 4 inches thick. The subsoil is mottled, grayish-brown and pale-brown, firm silty clay about 33 inches thick. The underlying material, extending to a depth of 50 inches, is brown silty clay loam and silty clay.

McGary soils are low in organic-matter content. The surface layer is slightly acid unless limed. These soils are slowly permeable and have a high available water capacity. Surface runoff is slow.

Wetness is the major limitation in the use and management of these soils. These soils are suited to all crops commonly grown in the county if a suitable drainage system is established and maintained.

Representative profile of McGary silt loam in a cultivated field at a point 150 feet north and 275 feet east of the southwest corner of SE¼SW¼ sec. 26, T. 2 N., R. 7 W.:

Ap—0 to 6 inches, grayish-brown (10YR 5/2) silt loam; moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A2—6 to 10 inches, light brownish-gray (10YR 6/2) silt loam; few, fine, distinct mottles of yellowish brown (10YR 5/4); weak, medium and coarse, granular structure; friable; slightly acid; abrupt, smooth boundary.

B21tg—10 to 21 inches, grayish-brown (10YR 5/2) silty clay; common, medium, distinct mottles of yellowish brown (10YR 5/6); moderate, medium, subangular and angular blocky structure; firm; few, thin, gray (10YR 6/1) clay films on most faces of peds; medium acid; clear, smooth boundary.

B22tg—21 to 35 inches, pale-brown (10YR 6/3) silty clay; common, medium, faint mottles of brownish yellow (10YR 6/6) and light brownish gray (10YR 6/2); moderate, medium, prismatic structure breaking to moderate, medium and coarse, angular blocky structure; firm; thin gray (10YR 6/1) clay films on all faces of peds; neutral; clear, smooth boundary.

B23tg—35 to 43 inches, grayish-brown (10YR 5/2) silty clay; many, medium, distinct mottles of yellowish brown (10YR 5/6); weak, moderate and coarse, prismatic structure breaking to moderate, blocky structure; firm; gray (10YR 5/1) clay films on all faces of peds; mildly alkaline; clear, irregular boundary.

C—43 to 50 inches, brown (10YR 5/3), stratified silty clay loam and silty clay; common, medium, distinct mottles of light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6); weak, very coarse, blocky structure; firm; few small lime concretions; moderately alkaline (calcareous).

The Ap horizon ranges from dark gray to grayish brown in color. The A2 horizon has been mixed into the Ap horizon in some areas. Depth to the C horizon ranges from 35 to 50 inches. The C horizon ranges from clay to heavy silty clay loam in texture.

The McGary soils are similar to Iva soils in drainage characteristics, but they have a higher clay content than those soils.

McGary silt loam (0 to 2 percent slopes) (Mg).—This soil is on terraces. Surface runoff is slow.

This soil is suited to all crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Wetness and the very slowly permeable subsoil are major limitations. Crops respond to lime and fertilizer. (Capability unit IIIw-6; woodland suitability group 3w5)

Montgomery Series

The Montgomery series consists of deep, very poorly drained soils that formed in lacustrine material in depressions on terraces. The native vegetation was mixed swamp forest and swamp grasses.

In a representative profile, the surface layer is very dark gray silty clay loam and silty clay about 13 inches thick. The subsoil is very firm silty clay about 22 inches thick. The upper 10 inches of the subsoil is mottled, dark gray, and the lower part is mottled, grayish brown. The underlying material, extending to a depth of 50 inches, is mottled, gray, firm silty clay.

Montgomery soils are high in organic-matter content. The surface layer is neutral or slightly acid. These soils are very slowly permeable and have a high available water capacity. Surface runoff is very slow.

Wetness is the major limitation in the use and management of these soils. Montgomery soils are suited to most crops commonly grown in the county if a suitable drainage system is established and maintained.

Representative profile of Montgomery silty clay loam in a cultivated field at a point 300 feet west and 350 feet south of the northeast corner of NW¼SE¼ sec. 26, T. 2 N., R. 7 W.:

Ap—0 to 7 inches, very dark gray (10YR 3/1) silty clay loam; moderate, medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

A1—7 to 13 inches, very dark gray (10YR 3/1) silty clay; moderate, fine and medium, subangular blocky structure; very firm; slightly acid; clear, wavy boundary.

B21g—13 to 23 inches, dark-gray (10YR 4/1) silty clay; few, fine, faint mottles of pale brown (10YR 6/3); moderate, fine and medium, prismatic structure parting to moderate, medium, blocky structure; very firm; few dark-gray (10YR 4/1) pressure faces or clay films on most faces of peds; neutral; gradual, wavy boundary.

B22g—23 to 35 inches, grayish-brown (2.5YR 5/2) silty clay; common, fine, distinct mottles of yellowish brown (10YR 5/4); weak, medium, prismatic structure parting to weak, medium to coarse, subangular blocky structure; very firm; gray (10YR 5/1) pressure faces or clay films on faces of peds and in crack fillings; neutral in upper part, becoming moderately alkaline (calcareous) in lower part; gradual, smooth boundary.

C—35 to 50 inches, gray (10YR 6/1) silty clay; common, medium, distinct mottles of yellowish brown (10YR 5/6); weak, medium, blocky structure; firm; very thin, dark-gray (10YR 4/1) clay films and crack fillings extending vertically; moderately alkaline (calcareous).

The A horizon ranges from 10 to 16 inches in thickness. The Ap horizon ranges from black to very dark grayish brown in color. The B2 horizon is heavy silty clay loam or silty clay in texture. Depth to the C horizon ranges from 28 to 42 inches.

Montgomery soils are similar to Kings soils, but they have more brown and yellow mottles in the B horizon than those soils.

Montgomery silty clay loam (0 to 2 percent slopes) (Mo).—This soil is in depressions on terraces. Surface runoff is very slow. Included with this soil in mapping are small areas of soils that have a silty clay surface layer.

This soil is suited to most crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, and meadow. Small grain is subject to damage from the high water table during winter and early in spring. Wetness is the major limitation. Capability unit IIIw-2; woodland suitability group 2w11)

Negley Series

The Negley series consists of deep, well-drained, moderately steep to very steep soils on uplands. These soils formed in material weathered from sandy and gravelly outwash with a mantle of loess less than 18 inches thick. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is brown loam about 7 inches thick. The subsoil is about 46 inches thick. The upper 31 inches of the subsoil is reddish-brown and yellowish-red, firm clay loam and sandy clay loam, and the lower part is strong-brown, friable light sandy clay loam. The underlying material, extending to a depth of 65 inches, is yellowish-brown and pale-brown sand that contains thin lenses of gravel.

Negley soils are low in organic-matter content and are strongly acid. These soils are moderately permeable and have a high available water capacity. Surface runoff is very rapid.

Runoff and erosion are the major hazards in the use and management of these soils. These soils are suited to permanent pasture and woodland.

Representative profile of Negley loam, 25 to 50 percent slopes, in a wooded area at a point 50 feet west and 350 feet north of the southeast corner of sec. 12, T. 5 N., R. 6 W.:

O1—¾ to ½ inch, partly decomposed leaf litter; neutral.

O2—½ inch to 0, decomposed leaf litter; neutral.

A1—0 to 1 inch, very dark grayish-brown (10YR 3/2) loam; moderate, fine, granular structure; very friable; many roots and leaf litter; medium acid; abrupt, wavy boundary.

A2—1 to 7 inches, brown (10YR 5/3) loam; weak, fine, subangular blocky structure; friable; abundant roots; common worm-hole fillings of material from A1 horizon; medium acid; abrupt, smooth boundary.

B1—7 to 11 inches, reddish-brown (5YR 4/4) heavy loam; weak, medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

B21t—11 to 25 inches, yellowish-red (5YR 4/6) clay loam; moderate, medium, subangular blocky structure; firm; thin reddish-brown (5YR 4/3) clay films on most faces of peds; very strongly acid; clear, smooth boundary.

B22t—25 to 38 inches, yellowish-red (5YR 4/6) sandy clay loam; moderate, medium and coarse, subangular blocky structure; firm; few pebbles; thin reddish-brown (5YR 4/3) clay films on most faces of peds; few brown (7.5YR 4/4) coatings on some peds; very strongly acid; clear, smooth boundary.

B3—38 to 53 inches, strong-brown (7.5YR 5/6) light sandy clay loam; weak, coarse, subangular blocky structure; friable; few, thin, reddish-brown (5YR 4/4) clay films on most faces of peds; strongly acid; gradual, wavy boundary.

C—53 to 65 inches, yellowish-brown (10YR 5/6) and pale-brown (10YR 6/3), banded sand; single grained; loose; some thin lenses of gravel at a depth of 8 feet; medium acid, becoming mildly alkaline below a depth of 12 feet.

The Ap horizon in cultivated areas ranges from dark grayish brown to brown in color. The B2 horizon ranges from clay loam

to sandy clay loam in texture. The loess ranges from 0 to 18 inches in thickness.

Negley soils are similar to Parke and Hickory soils. They have a greater sand content in the B horizon than those soils.

Negley loam, 25 to 50 percent slopes (NeF).—This soil has short, irregular slopes on the sides of natural draws. Included with this soil in mapping are small areas of moderately eroded and severely eroded soils. Also included are small areas of soils that have slopes of less than 25 percent.

This soil is suitable as woodland. It is not suitable as cropland, because of steep slopes and severe risk of erosion. Erosion and runoff are the major hazards. (Capability unit VIIe–1; woodland suitability group 1r2)

Nolin Series

The Nolin series consists of deep, well-drained, nearly level soils that formed in alluvium on bottom lands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is dark grayish-brown silty clay loam about 8 inches thick. The subsoil is brown, firm light silty clay loam about 32 inches thick. The underlying material, extending to a depth of 50 inches, is brown to yellowish-brown silt loam.

Nolin soils are moderate in organic-matter content, and they are neutral. These soils are moderately permeable and have a high available water capacity. Surface runoff is slow.

Flooding is the major hazard in the use and management of these soils. Most areas are protected by levees, but during periods of high water in winter and early in spring, seepage through levees causes some flooding.

Representative profile of Nolin silty clay loam in a cultivated field at a point 50 feet west and 20 feet south of the northeast corner of NW¼SE¼ sec. 6, T. 1 N., R. 7 W.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) light silty clay loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

B21—8 to 14 inches, brown (10YR 4/3) light silty clay loam; weak, medium, prismatic structure; firm; neutral; clear, smooth boundary.

B22—14 to 40 inches, brown (10YR 4/3) light silty clay loam; weak, medium, prismatic structure parting to weak, medium, subangular blocky structure; firm; few dark grayish-brown (10YR 4/2) stains on faces of peds; neutral; gradual, wavy boundary.

C—40 to 50 inches, brown (10YR 5/3) to yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure or massive; friable; neutral.

The A1 horizon is light silty clay loam or heavy silt loam in texture and ranges from dark grayish brown to brown or dark brown in color. The B horizon ranges from silty clay loam to heavy silt loam. The C horizon ranges from silt loam to light silty clay loam and contains lenses of fine sand. It is mildly alkaline to neutral.

Nolin soils are similar to Haymond and Armiesburg soils. They contain more clay in their subsoil than Haymond soils. In contrast to Armiesburg soils, Nolin soils have a light-colored surface layer.

Nolin silty clay loam (0 to 2 percent slopes) (No).—This soil is on broad bottom lands. Surface runoff is slow. Included with this soil in mapping are small areas of moderately well drained soils.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn and soybeans. Alfalfa and small grain are subject to severe damage during periods of prolonged flooding. Flooding is the major hazard. Most areas of these soils are protected by levees, but in winter and early in spring, seepage through levees causes some flooding. (Capability unit I–2; woodland suitability group 1o8)

Parke Series

The Parke series consists of deep, well-drained, nearly level to strongly sloping soils that formed in about 30 inches of loess and in the underlying material weathered from sandy and gravelly outwash on uplands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is brown silt loam about 7 inches thick. The subsoil is about 63 inches thick. The upper 7 inches of the subsoil is brown, friable heavy silt loam; the next 18 inches is dark-brown, firm silty clay loam; the next 23 inches is yellowish-red, firm clay loam; and the lower 15 inches is yellowish-red, friable sandy clay loam.

Parke soils are moderate in organic-matter content. The surface layer is strongly acid unless limed. These soils are moderately permeable and have a high available water capacity. Surface runoff is medium or rapid.

Runoff and erosion are the major hazards in the use and management of these soils.

Representative profile of Parke silt loam, 6 to 12 percent slopes, eroded, in a cultivated field at a point 300 feet north and 100 feet east of the southwest corner of NW¼ sec. 3, T. 5 N., R. 5 W.:

Ap—0 to 7 inches, brown (10YR 4/3) silt loam; moderate, fine, granular structure; friable; medium acid; abrupt, smooth boundary.

B1t—7 to 14 inches, brown (7.5YR 5/4) heavy silt loam; moderate, fine, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B21t—14 to 32 inches, dark-brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; firm; thin reddish-brown (5YR 4/4) clay films on faces of peds; few, thin, light yellowish-brown (10YR 6/4) silt coatings on faces of peds; very strongly acid; gradual, smooth boundary.

IIB22tb—32 to 55 inches, yellowish-red (5YR 4/6) clay loam; moderate, medium and coarse, subangular blocky structure; firm; thin reddish-brown (5YR 4/3) clay films on most faces of peds; pale-brown (10YR 6/3) silt streaks and coatings; few small rock fragments; very strongly acid; gradual, smooth boundary.

IIB3b—55 to 70 inches, yellowish-red (5YR 4/6) sandy clay loam; weak, very coarse, subangular blocky structure; friable; many brown (7.5YR 5/4) silt streaks and coatings; common black (10YR 2/1) concretions; common, small, rounded pebbles; strongly acid (medium acid to neutral sand and gravel at a depth of 12 to 15 feet).

The Ap horizon ranges from dark grayish brown to brown in color. The IIB22tb horizon ranges from clay loam to heavy sandy loam in texture. The thickness of the IIB22tb horizon ranges from 18 to 48 inches. The underlying material is mostly loose sand that contains thin strata of gravel.

Parke soils are similar to Alford and Negley soils. They have more sand and gritty material in the lower part of the profile than Alford soils, and they have a finer textured B2 horizon than Negley soils.

Parke silt loam, 2 to 6 percent slopes, eroded (PaB2).—This soil is on narrow ridgetops. The plow layer is a mixture of the original surface layer and a moderate amount of the brown subsoil. Surface runoff is medium. Included with this soil in mapping are small areas of nearly level

soils. Also included are small areas of soils that are severely eroded.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. It is also suited to orchards. Erosion and runoff are the major hazards. (Capability unit IIe-1; woodland suitability group 1o1)

Parke silt loam, 6 to 12 percent slopes, eroded (PaC2).—This soil is on side slopes below ridgetops. This soil has the profile described as representative for the series. It has lost 3 to 5 inches of the original surface layer through erosion, and the plow layer is a mixture of the original surface layer and a moderate amount of the brown subsoil. Surface runoff is medium. Included with this soil in mapping are small areas of severely eroded soils.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. It is also suited to orchards. Erosion and runoff are the major hazards. (Capability unit IIIe-1; woodland suitability group 1o1)

Parke silt loam, 6 to 12 percent slopes, severely eroded (PaC3).—This soil is on side slopes below ridgetops. It has a profile similar to that described as representative for the series, but it has lost more than 6 inches of the original surface layer through erosion. The plow layer is mostly brown subsoil material but contains a moderate amount of the original surface layer. Surface runoff is rapid. Included with this soil in mapping are small deeply gullied areas.

This soil is suited to small grain, meadow, and pasture. It is also well suited to orchards. The severe risk of erosion limits use for row crops. Erosion and runoff are the major hazards. A seedbed is generally more difficult to prepare on this soil than on less eroded Parke soils. The surface layer tends to become cloddy, and this results in poorer stands. (Capability unit IVe-1; woodland suitablity group 1o1)

Parke silt loam, 12 to 18 percent slopes, eroded (PaD2).—This soil is on sides of natural draws and on irregular slopes below ridgetops. From 4 to 6 inches of the original surface layer has been removed through erosion, and the plow layer is a mixture of the original surface layer and a moderate amount of the brown subsoil. Surface runoff is rapid. Included with this soil in mapping are small areas of severely eroded soils.

This soil is suited to small grain, meadow, and pasture. It is well suited to orchards. The severe risk of erosion limits use for row crops. Erosion and runoff are the major hazards. (Capability unit IVe-1; woodland suitability group 1o1)

Peoga Series

The Peoga series consists of deep, poorly drained, nearly level soils that formed in about 50 inches of loess over weathered lakebed material in old lakebeds. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is mottled, gray silt loam about 10 inches thick (fig. 12). The subsurface layer is mottled, gray, friable silt loam about 5 inches thick. The subsoil is mottled, gray, and about 40 inches thick. The upper 8 inches of the subsoil is friable silt loam, and the lower 32 inches is firm silty clay loam. The underlying material, extending to a depth of 90 inches, is mottled, gray silty clay loam and silty loam.

Peoga soils are low in organic-matter content. The surface layer is strongly acid unless limed. These soils are very slowly permeable and have a high available water capacity. Surface runoff is slow.

Wetness and the very slowly permeable subsoil are the major limitations in the use and management of these soils. These soils are suited to most crops commonly grown in the county if a suitable drainage system is established and maintained.

Representative profile of Peoga silt loam in a cultivated field at a point 200 feet west and 1,270 feet south of the northeast corner of NW¼ sec. 35, T. 3 N., R. 5 W.:

Ap—0 to 10 inches, gray (10YR 5/1) silt loam; few, fine, distinct mottles of dark brown (10YR 4/3); moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A2g—10 to 15 inches, gray (10YR 5/1) silt loam; many, medium, distinct mottles of dark brown (10YR 4/3); moderate, medium to thick, platy structure; friable; gray silty material extends vertically around prismatic caps, tongues into the argillic horizon, and occurs as fillings in old krotovinas that are 1 to 3 inches in diameter and 1 to 3 feet apart; very strongly acid; clear, irregular boundary.

B1g—15 to 23 inches, gray (10YR 5/1) silt loam; many, medium, distinct mottles of dark yellowish brown (10YR 4/4); weak, medium, prismatic structure; friable; thin to thick, gray (10YR 6/1) silt films on all faces of peds and as fillings in krotovinas; extremely acid; clear, irregular boundary.

B21tg—23 to 28 inches, gray (10YR 6/1) light silty clay loam; many, medium, distinct mottles of yellowish brown (10YR 5/4); moderate, coarse, prismatic structure; firm; dark-gray (10YR 4/1), thin to medium clay films on most faces of peds and gray (10YR 6/1) silt coatings on faces of peds and as fillings in krotovinas; extremely acid; clear, irregular boundary.

B22tg—28 to 55 inches, gray (5Y 6/1) silty clay loam; many, medium, distinct mottles of dark yellowish brown (10YR 4/4); strong, coarse, prismatic structure; firm; medium and thick, gray (N 5/0) clay films on all faces of peds; projections of gray (10YR 5/1) A2 material in crayfish casts; soft black manganese and iron oxide accumulations; extremely acid; clear, irregular boundary.

Cg—55 to 90 inches, gray (10YR 5/1) silty clay loam and silt loam that contains enough sand to have a gritty feel; common, medium, distinct mottles of yellowish brown (10YR 4/4); massive; firm; very strongly acid, grading to slightly acid at a depth of 90 inches.

The Ap horizon ranges from gray to very dark grayish brown in color. Depth to the B2 horizon ranges from 18 to 24 inches. The B2 horizon ranges from light clay loam to light silty clay loam in texture. In some areas the B1 horizon is absent and there is an abrupt change in texture between the A2 and B2 horizon and tongues of A2 material extend into the B2 horizon. The C horizon ranges from very strongly acid to slightly acid.

Peoga soils are similar to Vigo and Iva soils. They differ from Vigo and Iva soils because they have a grayer profile, are poorly drained, and formed in loess and lakebed material. They differ from Iva soils because they are more deeply leached and have a very slowly permeable subsoil.

Peoga silt loam (0 to 2 percent slopes) (Pe).—This soil is in old glacial lakebeds. Surface runoff is slow. Included with this soil in mapping are small areas of somewhat poorly drained soils.

This soil is suited to most crops commonly grown in the county if a suitable drainage system is established and maintained. It is not well suited to alfalfa and other deep-rooted crops, because the very slowly permeable subsoil re-

Figure 12.—**Profile of Peoga silt loam.**

stricts root penetration. Wetness and the very slowly permeable subsoil are the major limitations. (Capability unit IIIw-12; woodland suitability group 2w11)

Petrolia Series

The Petrolia series consists of deep, poorly drained, nearly level soils that formed in alluvium on bottom lands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is gray silty clay loam about 9 inches thick. The subsoil is firm silty clay loam about 31 inches thick. The upper 15 inches of the subsoil is mottled and light brownish gray; the lower part is mottled and dark gray. The underlying material, extending to a depth of 50 inches, is mottled, dark-gray and pale-brown stratified silty clay loam and silt loam.

Petrolia soils are moderate in organic-matter content. These soils are neutral. They are moderately slowly permeable and have a high available water capacity. Surface runoff is very slow or ponded.

Flooding and wetness are the major hazards in the use and management of these soils. These soils are suited to most crops commonly grown in the county if an adequate drainage system is installed and maintained.

Representative profile of Petrolia silty clay loam in a cultivated field at a point 75 feet east and 10 feet north of the southwest corner of NE¼NW¼ sec. 12, T. 3 N., R. 8 W.:

Ap—0 to 9 inches, dark-gray (10YR 4/1) silty clay loam; weak to moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.

B21g—9 to 17 inches, light brownish-gray (10YR 6/2) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/4) and dark grayish brown (10YR 4/2); moderate, medium, subangular blocky structure; firm; few, thin, dark-gray (10YR 4/1) organic films on most faces of peds; neutral; clear, smooth boundary.

B22g—17 to 24 inches, light brownish-gray (10YR 6/2) silty clay loam; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); weak, medium, prismatic structure parting to moderate, medium, subangular blocky structure; firm; dark-gray (10YR 4/1) organic films on most faces of peds; grayish-brown (10YR 5/2) silt coatings on faces of peds and in cracks; neutral; gradual, smooth boundary.

B23g—24 to 40 inches, dark-gray (10YR 4/1) silty clay loam; few, medium, distinct mottles of dark yellowish brown (10YR 4/4); weak, coarse, prismatic structure parting to weak, medium, subangular blocky structure; firm; neutral; gradual, smooth boundary.

Cg—40 to 50 inches, dark-gray (10YR 4/1) and pale-brown (10YR 6/3), stratified silty clay loam and silt loam; common, medium, distinct mottles of light brownish gray (10YR 6/2); massive; firm; neutral to mildly alkaline.

The Ap horizon ranges from dark gray to brownish gray in color. Depth to mottling ranges from 7 to 15 inches. The B2 horizon ranges from dark gray to pale brown and contains common to many, distinct mottles. The C horizon ranges from silty clay loam to silt loam in texture. Strata of sandy loam, loam, or clay loam are in some areas at depths of more than 20 inches. The C horizon ranges from slightly acid to mildly alkaline.

Petrolia soils are similar to Wakeland and Stendal soils. They contain more clay in their subsoil than Wakeland and Stendal soils. They also differ from Stendal soils because they are neutral.

Petrolia silty clay loam (0 to 2 percent slopes) (Po).—This soil is on bottom lands. Surface runoff is very slow or ponded. Included with this soil in mapping are a few small areas of moderately well drained soils.

This soil is suited to most crops commonly grown in the county if an adequate drainage system is established and maintained. It is used mainly for corn, soybeans, meadow, and pasture. Alfalfa and small grain are subject to damage during periods of prolonged flooding. Flooding and wetness are the major hazards. Most areas along the West Fork of the White River are protected by levees, but during periods of high water, seepage from levees causes some flooding. (Capability unit IIw-7; woodland suitability group 2w13)

Princeton Series

The Princeton series consists of deep, well-drained, nearly level to strongly sloping soils that formed in more than 5 feet of windblown sand and silt on uplands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is dark-brown fine sandy loam about 7 inches thick. The subsurface layer is brown fine sandy loam about 5 inches thick. The subsoil is about 36 inches thick. The upper 19 inches of the subsoil is brown, firm sandy clay loam. The lower part is dark yellowish-brown and yellowish-brown, friable light sandy clay loam to sandy loam. The underlying material, extending to a depth of 60 inches, is pale-brown fine sand.

Princeton soils are moderate in organic-matter content. The surface layer is medium acid unless limed. These soils are moderately permeable and have a moderate available water capacity. Surface runoff is slow to rapid.

Runoff and erosion are hazards and the medium available water capacity is a limitation in the use and management of these soils.

Representative profile of Princeton fine sandy loam, 6 to 12 percent slopes, eroded, at a point 125 feet east and 25 feet south of the northwest corner of NE¼SE¼ sec. 19, T. 2 N., R. 7 W.:

Ap—0 to 7 inches, dark-brown (10YR 4/3) fine sandy loam; weak, medium, granular structure; very friable; medium acid; abrupt, smooth boundary.

A2—7 to 12 inches, brown (10YR 5/3) fine sandy loam; weak, coarse, granular structure; very friable; slightly acid; clear, smooth boundary.

B21t—12 to 22 inches, brown (7.5YR 4/4) sandy clay loam; moderate, medium, subangular blocky structure; firm; few reddish-brown (5YR 4/4) clay films on most faces of peds; medium acid; clear, wavy boundary.

B22t—22 to 31 inches, brown (7.5YR 4/4) sandy clay loam; moderate, medium and coarse, subangular blocky structure; firm; thin reddish-brown (5YR 4/4) clay films on faces of peds; strongly acid; clear, smooth boundary.

B23t—31 to 41 inches, yellowish-brown (10YR 5/4) heavy sandy loam; weak, coarse, subangular blocky structure; friable; reddish-brown (5YR 4/4) clay films on few faces of peds; medium acid; gradual, wavy boundary.

B3—41 to 48 inches, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/4), banded sandy loam and light sandy clay loam; weak, coarse, subangular blocky structure; friable; slightly acid; abrupt, wavy boundary.

C—48 to 60 inches, yellowish-brown (10YR 5/6) and pale-brown (10YR 6/3) fine sand; single grained; loose; mildly alkaline.

The Ap horizon ranges from dark grayish brown to brown in color. The upper part of the B horizon ranges from sandy loam to light clay loam in texture. The lower part of the B horizon is sandy loam or sandy clay loam.

Princeton soils are similar to Bloomfield soils. They differ from those soils because they have a continuous textural B horizon and have a higher clay content.

Princeton fine sandy loam, 0 to 2 percent slopes (PrA).—This soil is in small irregular areas on uplands. It has a profile similar to that described as representative for the series, but it has a thicker surface layer. Surface runoff is slow. Included with this soil in mapping are small areas of soils that have a loamy fine sand surface layer. Also included are small areas of gently sloping soils.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. The moderate available water capacity is the major limitation. In years when rainfall is below average or poorly distributed, crops are subject to damage from drought. Planting early in spring helps to overcome potential crop damage from drought. Crops respond well to lime and fertilizer. (Capability unit IIs–5; woodland suitability group 1r2)

Princeton fine sandy loam, 2 to 6 percent slopes, eroded (PrB2).—This soil is on narrow ridgetops and on side slopes. It has a profile similar to that described as representative for the series, but it has lost 4 to 6 inches of the original surface layer through erosion. The plow layer is a mixture of the original surface layer and a moderate amount of the brown subsoil. Surface runoff is moderately slow. Included with this soil in mapping are small areas of soils that have a loamy fine sand surface layer.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Runoff and erosion are hazards, and the moderate available water capacity is a limitation. During years of below-average or poorly distributed rainfall, crops are subject to damage from drought. (Capability unit IIe–11; woodland suitability group 1r2)

Princeton fine sandy loam, 6 to 12 percent slopes, eroded (PrC2).—This soil has short irregular slopes. It has the profile described as representative for the series. About 4 to 7 inches of the original surface layer has been removed through erosion. The plow layer is a mixture of the original surface layer and a moderate amount of the brown subsoil. Surface runoff is medium. Included with this soil in mapping are small areas of soils that have a loamy fine sand surface layer.

This soil is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Runoff and erosion are hazards, and the moderate available water capacity is a limitation. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. (Capability unit IIIe–15; woodland suitability group 1r2)

Princeton fine sandy loam, 12 to 18 percent slopes, eroded (PrD2).—This soil is on side slopes below ridgetops. It has a profile similar to that described as representative for the series, but it has lost 4 to 7 inches of the original surface layer through erosion. The plow layer is a mixture of the original surface layer and a moderate amount of the brown subsoil. Surface runoff is rapid. Included with this soil in mapping are small areas of soils that have a loamy fine sand surface layer.

This soil is suited to small grain, meadow, and pasture. An occasional row crop can be grown, but the erosion hazard is severe. Runoff and erosion are hazards, and the moderate available water capacity is a limitation. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. (Capability unit IVe–15; woodland suitability group 1r2)

Ragsdale Series

The Ragsdale series consist of deep, very poorly drained, nearly level soils that formed in more than 5 feet of silty loess in depressions on uplands. The native vegetation was swamp forest and marsh grasses.

In a representative profile, the surface layer is silt loam about 17 inches thick. The upper 10 inches of this layer is very dark brown, and the lower part is very dark gray. The subsoil is about 37 inches thick. The upper 13 inches of the subsoil is mottled, dark grayish-brown and grayish-brown, firm silty clay loam, and the lower part is mottled, olive-brown, firm light silty clay loam. The underlying material, extending to a depth of 65 inches, is light yellowish-brown and brownish-yellow silt loam.

Ragsdale soils are high in organic-matter content. The surface layer is neutral or slightly acid. These soils are slowly permeable and have a high available water capacity. Surface runoff is very slow or ponded.

Wetness is the major limitation in the use and management of these soils. Ragsdale soils are suited to all crops commonly grown in the county if a suitable drainage system is established and maintained.

Representative profile of Ragsdale silt loam in a cultivated field at a point 70 feet east and 210 feet north of the southwest corner NE¼ sec. 12, T. 3 N., R. 7 W.:

Ap—0 to 10 inches, very dark brown (10YR 2/2) silt loam; weak, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A1—10 to 17 inches, very dark gray (10YR 3/1) silt loam; moderate, medium, granular structure and moderate fine, subangular blocky structure; friable; slightly acid; gradual, irregular boundary.

B21tg—17 to 30 inches, dark grayish-brown (2.5Y 4/2) and grayish-brown (2.5Y 5/2) silty clay loam; common, medium, distinct mottles of olive brown (2.5Y 4/4); moderate, medium and coarse, subangular blocky structure; firm; thin, gray (10YR 5/1) clay films on all faces of peds; very dark gray (10YR 3/1) material from A1 horizon in worm casts and old root channels; slightly acid; gradual, smooth boundary.

B22t—30 to 54 inches, light olive-brown (2.5Y 5/4) light silty clay loam; common, medium, distinct mottles of grayish brown (2.5Y 5/2); moderate, coarse, subangular blocky structure; firm; gray (10YR 5/1) clay films on faces of peds; very dark gray (10YR 3/1) material from A1 horizon in root channels and crack fillings; neutral; clear, smooth boundary.

C—54 to 65 inches, light yellowish-brown (10YR 6/4) and brownish-yellow (10YR 6/6) silt loam; massive; friable; light brownish-gray streaks and splotches; dark-gray (10YR 4/1) coatings in old root channels; neutral to mildly alkaline.

The Ap horizon ranges from black to very dark grayish brown in color. The A horizon ranges from 10 to 18 inches in thickness. The B2 horizon ranges from gray to grayish brown in the upper part to yellowish brown or light brown in the lower part. The B2 horizon ranges from light silty clay loam to silty clay loam in texture. The depth to the C horizon ranges from 48 to 60 inches.

Ragsdale soils are similar to Vincennes and Lyles soils. They are less acid and have a darker colored, more friable A horizon than Vincennes soils. They have less sand in their profile than Lyles soils.

Ragsdale silt loam (0 to 2 percent slopes) (Ra).—This soil is in depressions on uplands. Surface runoff is very slow or ponded. Included with this soil in mapping are small areas of soils that have a light silty clay loam surface layer. Also included are small areas of somewhat poorly drained soils.

This soil is suited to all crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, small grain, and meadow. Wetness is the major limitation. (Capability unit IIw-1; woodland suitability group 2w11)

Reesville Series

The Reesville series consists of deep, somewhat poorly drained, nearly level soils that formed in about 6 feet of loess on uplands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsoil is about 30 inches thick. The upper 6 inches of the subsoil is mottled, pale-brown, firm light silty clay loam; the next 19 inches is mottled, brown and yellowish-brown firm silty clay loam; and the lower 5 inches is mottled, light olive-brown, friable silt loam. The underlying material, extending to a depth of 50 inches, is mottled, light olive-brown and grayish-brown silt loam.

Reesville soils are moderate in organic-matter content. The surface layer is medium acid unless limed. These soils are slowly permeable and have a high available water capacity. Surface runoff is slow.

Wetness is the major limitation in the use and management of these soils. Reesville soils are suited to crops commonly grown in the county if a suitable drainage system is established and maintained.

Representative profile of Reesville silt loam in a cultivated field at a point 200 feet east and 75 feet south of the northwest corner of SE¼NW¼ sec. 12, T. 3 N., R. 7 W.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; friable; neutral; abrupt, smooth boundary.

B1t—8 to 14 inches, pale-brown (10YR 6/3) light silty clay loam; common, fine, faint mottles of brown (10YR 5/3) and common, medium, distinct mottles of grayish brown (10YR 5/2); moderate, fine and medium, subangular blocky structure; firm; light-gray (10YR 7/1) silt coatings on faces of peds; medium acid; clear, smooth boundary.

B21t—14 to 23 inches, brown (10YR 5/3) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/6) and grayish brown (10YR 5/2); moderate, medium, subangular blocky structure; firm; thick, gray (10YR 5/1) clay films on all faces of peds; few black (10YR 2/1) iron and manganese concretions; strongly acid; clear, wavy boundary.

B22t—23 to 33 inches, brown (10YR 5/3) and yellowish-brown (10YR 5/4) silty clay loam; common, medium, distinct mottles of grayish brown (10YR 5/2) and common, fine, distinct mottles of yellowish brown (10YR 5/4); weak, medium, prismatic structure parting to moderate, medium, angular and subangular blocky structure; firm; thick, dark grayish-brown (10YR 4/2) and gray (10YR 5/1) clay films on all faces of peds; few black (10YR 2/1) iron and manganese concretions; medium acid; clear, smooth boundary.

B3—33 to 38 inches, light olive-brown (2.5Y 5/4) silt loam; common, medium, distinct mottles of light yellowish brown (2.5Y 6/4) and light brownish gray (10YR 6/2); weak, coarse, subangular blocky structure; friable; dark-gray (10YR 4/1) clay films on faces of peds; neutral; clear, wavy boundary.

C—38 to 50 inches, light olive-brown (2.5Y 5/6) and grayish-brown (2.5Y 5/2) silt loam; few, fine, distinct mottles of brownish yellow (10YR 6/6); massive; friable; few, medium, light-gray (2.5Y 7/2) lime concretions; mildly alkaline (calcareous).

The Ap horizon ranges from dark grayish brown to grayish brown in color. The B2 horizon ranges from silty clay loam to heavy silt loam in texture and from pale brown to yellowish brown or light olive brown in color. This horizon contains common, medium, distinct mottles of light brownish gray or grayish brown. Depth to carbonates ranges from 32 to 44 inches.

Reesville soils are similar to Iva and Ayrshire soils. They

are less acid and have a thinner solum than Iva soils, and they have more silt throughout than Ayrshire soils.

Reesville silt loam (0 to 2 percent slopes) (Re).—This soil is on broad upland flats. Surface runoff is slow. Included with this soil in mapping are small areas of soils that have slopes of more than 2 percent.

This soil is suited to all crops commonly grown in the county if an adequate drainage system is established and maintained. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Wetness is the major limitation. (Capability unit IIw–2; woodland suitability group 3w5)

Ross Series

The Ross series consists of deep, well-drained soils that formed in alluvium on bottom lands. The native vegetation was prairie grasses.

In a representative profile, the surface layer is about 27 inches thick. The upper 8 inches of this layer is very dark brown loam, the next 11 inches is black, friable loam, and the lower 8 inches is very dark brown, firm light clay loam. The subsoil is dark-brown and dark yellowish-brown, firm light clay loam about 17 inches thick. The underlying material, extending to a depth of 50 inches, is brown and yellowish-brown, stratified light clay loam and loam.

Ross soils are high in organic-matter content, and they are neutral. They are moderately permeable and have a high available water capacity. Surface runoff is slow.

Flooding is the major hazard in the use and management of these soils. These soils are suited to most crops commonly grown in the county.

Representative profile of Ross loam in a cultivated field at a point 320 feet north and 1,300 feet west of southeast corner of Donation 158, T. 3 N., R. 8 W.:

Ap—0 to 8 inches, very dark brown (10YR 2/2) loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A11—8 to 19 inches, black (10YR 2/1) loam; weak, fine, subangular blocky structure; friable; neutral; gradual, smooth boundary.

A12—19 to 27 inches, very dark brown (10YR 2/2) light clay loam; moderate, medium, subangular blocky structure; firm; neutral; clear, smooth boundary.

B21—27 to 36 inches, dark-brown (10YR 4/3) light clay loam; weak, medium, prismatic structure parting to moderate, medium, subangular blocky structure; firm; very dark grayish-brown (10YR 3/2) organic stains or clay films on some faces of peds; neutral; gradual, smooth boundary.

B22—36 to 44 inches, dark yellowish-brown (10YR 4/4) light clay loam; weak, coarse, prismatic structure parting to weak, medium, subangular blocky structure; firm; dark-gray (10YR 4/1) clay films and stains on most faces of peds; neutral; gradual, smooth boundary.

C—44 to 50 inches, brown (10YR 5/3) and yellowish-brown (10YR 5/4), stratified light clay loam and loam; common, medium, distinct mottles of grayish brown (10YR 5/2); massive; friable; neutral to mildly alkaline.

The Ap horizon is very dark brown, very dark grayish brown, or dark brown in color. The A horizon ranges from 24 to 32 inches in thickness. The B horizon ranges from brown to yellowish brown and from loam to light clay loam. The stratified C horizon ranges from neutral to mildly alkaline.

Ross soils are similar to Armiesburg and Haymond soils. They differ from Armiesburg soils because they have a dark-colored A horizon more than 24 inches thick. They have a darker A horizon and formed in finer textured material than Haymond soils.

Ross loam (0 to 2 percent slopes) (Ro).—This soil is on broad bottom lands. Included with this soil in mapping are small areas of moderately well drained soils.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, meadow, and pasture. Alfalfa and small grain are subject to severe damage during periods of prolonged flooding. Flooding is the major hazard. Most areas have been protected by levees, but during periods of high water in winter and early in spring, seepage from levees causes some flooding. (Capability unit I–2; woodland suitability group o23)

Stendal Series

The Stendal series consists of deep, somewhat poorly drained soils that formed in alluvium on bottom lands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is grayish-brown silt loam about 7 inches thick. The subsoil is mottled, grayish-brown and brown, friable silt loam about 24 inches thick. The underlying material, extending to a depth of 56 inches, is mottled, gray silt loam stratified with thin layers of fine sand.

Stendal soils are low in organic-matter content. The surface layer is strongly acid unless limed. These soils are moderately permeable and have a high available water capacity. Surface runoff is slow.

Flooding and wetness are the major hazards in the use and management of these soils. Stendal soils are suited to most crops commonly grown in the county if an adequate drainage system is installed and maintained.

Representative profile of Stendal silt loam in a cultivate field at a point 1,980 feet south and 650 feet west of the northeast corner of sec. 10, T. 2 N., R. 5 W.:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; friable; slightly acid; clear, smooth boundary.

B2g—7 to 31 inches, grayish-brown (10YR 5/2) and brown (10YR 5/3) silt loam; common, medium, faint mottles of yellowish brown (10YR 5/4) and common, fine mottles of gray (10YR 6/1); weak, medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

Cg—31 to 56 inches, gray (10YR 6/1) silt loam and thin layers of very fine sand; many, coarse, faint mottles of light gray (10YR 7/1) and common, medium, distinct mottles of yellowish brown (10YR 5/8); friable; massive; very strongly acid.

The Ap horizon ranges from very dark grayish brown to grayish brown in color. Depth to mottling ranges from 6 to 14 inches. The solum is strongly acid or very strongly acid. The B horizon ranges from silt loam to light silty clay loam in texture. The C horizon ranges from silt loam to loam and contains thin strata of sand in most places.

Stendal soils are similar to Bonnie and Wakeland soils. They have a browner profile than Bonnie soils, and they are more acid than Wakeland soils.

Stendal silt loam (0 to 2 percent slopes) (Sr).—This soil is on bottom lands along small streams. Surface runoff is slow. Included with this soil in mapping are small areas of poorly drained soils.

This soil is suited to corn, soybeans, meadow, and pasture if a suitable drainage system is established and maintained. Small grain and alfalfa are subject to severe dam-

age from flooding during winter and early in spring. Wetness is a limitation, and flooding a hazard. (Capability unit IIw–7; woodland suitability group 2w13)

Strip Mines

Strip mines (St) consists of narrow, elongated mounds of mine spoil and a few open pits. Some pits contain water, and some are dry. The spoil material consists mainly of mixed soil material, till, shale, sandstone, and some coal. Included with this land type in mapping are piles of material or dumps from shaft mining or coal washings. This residue consists of low-grade coal or carbonaceous shale that is inert, sterile, low in carbon content, and high in ash. The spoil ranges from very strongly acid to neutral. The mounds are nearly level or gently sloping along the top and at the base and strongy sloping to very steep on the sides. Vertical escarpments border at least one side of most pit areas.

This land is suited to timber production and provides natural lakes for wildlife habitat or recreation. In places the spoil can be seeded to grass and legumes and used for pasture. (Capability unit VIIe–3; woodland suitability group 4r16)

Vigo Series

The Vigo series consists of deep, somewhat poorly drained, nearly level soils that formed in about 45 inches of loess and in material weathered from till on uplands. A firm claypan is at a depth of about 22 inches. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is grayish-brown silt loam about 7 inches thick. The subsurface layer is mottled, light brownish-gray and gray, friable silt loam about 15 inches thick. The subsoil is firm and about 56 inches thick. The upper 26 inches of the subsoil is mottled, gray silty clay loam, and the lower 30 inches is mottled, light yellowish-brown light silty clay loam. The underlying material, extending to a depth of 96 inches, is mottled, light yellowish-brown silt loam.

Vigo soils are low in organic-matter content. The surface layer is strongly acid unless limed. These soils are very slowly permeable and have a high available water capacity. Surface runoff is slow.

Wetness and the very slowly permeable subsoil are the major limitations in the use and management of these soils. These soils are suited to most crops commonly grown in the county if a suitable drainage system is established and maintained. They are not well suited to alfalfa and other deep-rooted crops, because the very slowly permeable subsoil restricts root penetration.

Representative profile of Vigo silt loam in a cultivated field at a point 300 feet east and 275 feet south of the northwest corner of SW¼ sec. 23, T. 2 N., R. 5 W.:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) silt loam; moderate, fine, granular structure; friable; strongly acid; abrupt, smooth boundary.

A21—7 to 18 inches, light brownish-gray (10YR 6/2) and gray (10YR 6/1) silt loam; common, medium, distinct mottles of yellowish brown (10YR 5/8) and brown (7.5YR 4/4); strong, thin, platy structure to weak, thick, platy structure; friable; few, small, black (10YR 2/1) iron and manganese concretions; strongly acid; clear, smooth boundary.

A22—18 to 22 inches, gray (10YR 6/1) silt loam; common, fine, distinct mottles of yellowish brown (10YR 5/8); weak, coarse, prismatic structure parting to weak, thick, platy structure; friable; light-gray (10YR 7/1) silt coatings along crack fillings; very strongly acid; abrupt, irregular boundary.

B21tg—22 to 35 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/8); strong, coarse, prismatic structure; very firm; light-gray (10YR 7/1) silt films on most faces of peds and in cracks; thick, gray (10YR 5/1) clay films on many faces of peds; few dark-brown (7.5YR 4/4) iron and manganese concretions; very strongly acid; gradual, smooth boundary.

B22tg—35 to 48 inches, gray (10YR 6/1) silty clay loam; many, coarse, distinct mottles of strong brown (10YR 5/6); moderate, coarse, prismatic structure; very firm; light-gray (10YR 7/1) silt coatings on most faces of peds and in crack fillings; gray (10YR 5/1) clay films on faces of peds; few very dark brown (10YR 2/2) iron and manganese concretions; very strongly acid; gradual, smooth boundary.

IIB3tg—48 to 78 inches, light yellowish-brown (10YR 6/4) light silty clay loam; many, medium, distinct mottles of gray (10YR 6/1) and common, medium, distinct mottles of dark brown (7.5YR 4/4); weak, very coarse, prismatic structure; firm; gray (10YR 5/1) clay films in vertical crack fillings; common, medium, distinct, black (10YR 2/1) iron and manganese concretions; strongly acid; gradual, smooth boundary.

IIC—78 to 96 inches, light yellowish-brown (10YR 6/4) silt loam; many, coarse, distinct mottles of gray (10YR 6/1); massive; friable; thick, gray (10YR 6/1 or 5/1) clay films in crack fillings; strongly acid, becoming medium acid in the lower part.

The Ap horizon ranges from dark grayish brown to grayish brown or brown in color. Depth to the B2 horizon ranges from 19 to 24 inches. Depth to mottling ranges from 6 to 14 inches. The C horizon ranges from silt loam, which contains enough sand to have a gritty feel, to light clay loam and from strongly acid to slightly acid.

Vigo soils are similar to Iva and Bartle soils. They differ from Iva soils because they have a thicker A2 horizon and have a claypan. Vigo soils differ from Bartle soils because they have a thicker solum and do not have a fragipan.

Vigo silt loam (0 to 2 percent slopes) (Vg).—This soil is on broad flats and small ridgetops. Surface runoff is slow. Included with this soil in mapping are small areas of gently sloping soils.

This soil is suited to most crops commonly grown in the county if a suitable drainage system is established and maintained. It is not well suited to alfalfa and other deep-rooted crops, because the very slowly permeable subsoil restricts root penetration. Wetness and the very slowly permeable subsoil are the major limitations. (Capability unit IIIw–3; woodland suitability group 3w5)

Vincennes Series

The Vincennes series consists of deep, very poorly drained soils that formed in loamy outwash material. The native vegetation was swamp forest and marsh grasses.

In a representative profile, the surface layer is gray clay loam about 9 inches thick. The subsoil is firm clay loam about 46 inches thick. It is mottled, grayish brown in the upper part and mottled, gray in the lower part. The underlying material, extending to a depth of 65 inches, is gray and very dark gray, stratified clay loam, sandy loam, and fine sand.

Vincennes soils are moderate in organic-matter content. The surface layer is medium acid unless limed. These soils

are slowly permeable and have a high available water capacity. Surface runoff is very slow or ponded.

Wetness is the major limitation in the use and management of these soils. Vincennes soils are suited to most crops commonly grown in the county if a suitable drainage system is established and maintained.

Representative profile of Vincennes clay loam in a cultivated field at a point 250 feet south and 55 feet west of the northeast corner of SW¼ sec. 8, T. 3 N., R. 7 W.:

Ap—0 to 9 inches, dark-gray (10YR 4/1) clay loam; moderate, medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

B21g—9 to 14 inches, grayish-brown (10YR 5/2) to light brownish-gray (10YR 6/2) clay loam; common, fine and medium mottles of dark brown (7.5YR 4/4); weak, coarse, granular structure parting to weak, fine, subangular blocky structure; firm; strongly acid; clear, smooth boundary.

B22g—14 to 20 inches, gray (10YR 5/1) clay loam; common, medium, distinct mottles of dark brown (7.5YR 4/4); moderate, medium, prismatic structure parting to moderate, medium, subangular blocky structure; firm; thin, dark-gray (10YR 4/1) clay or organic films on faces of peds; strongly acid; gradual, wavy boundary.

B23g—20 to 40 inches, gray (10YR 5/1) clay loam; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); moderate, medium, prismatic structure parting to moderate, medium and coarse, subangular blocky structure; firm; dark-gray (10YR 4/1) clay or organic films on faces of peds; common, small, rounded, very dark grayish-brown (10YR 3/2) iron and manganese concretions; strongly acid; gradual, wavy boundary.

B24g—40 to 55 inches, gray (10YR 5/1) clay loam and thin lenses of sand; many, medium mottles of dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/8); weak, medium and coarse, prismatic structure; firm; very dark gray (N 3/0) clay or organic films on peds and in crack fillings; few, medium, rounded, very dark gray (10YR 3/1) iron and manganese concretions; strongly acid; gradual, wavy boundary.

Cg—55 to 65 inches, gray (10YR 5/1) and very dark gray (N 3/0), stratified clay loam, sandy loam, and fine sand; massive; firm; strongly acid.

The Ap horizon ranges from dark grayish brown to dark gray in color. The B2 horizon ranges from clay loam to sandy clay loam in texture. The solum ranges from 40 to 60 inches in thickness.

Vincennes soils are similar to Lyles soils. They differ from Lyles soils because they have a lighter colored A horizon and are strongly acid.

Vincennes clay loam (0 to 2 percent slopes) (Vn).—This soil is in depressions on terraces. Surface runoff is very slow or ponded. Included with this soil in mapping are small areas of soils that have a darker colored surface layer. Also included are small areas of soils that have thin layers of loam and sandy loam over the clay loam surface layer.

This soil is suited to all crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, and small grain. It is also suited to meadow and pasture. Wetness is the major limitation. (Capability unit IIw-1; woodland suitability group 2w11)

Wakeland Series

The Wakeland series consists of deep, somewhat poorly drained, nearly level soils that formed in alluvium on bottom lands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is brown silt loam about 8 inches thick. The subsoil is mottled, grayish-brown, friable silt loam about 22 inches thick. The underlying material, extending to a depth of 50 inches, is mottled, yellowish-brown silt loam.

Wakeland soils are low in organic-matter content, and they are slightly acid or neutral. They are moderately permeable and have a high available water capacity. Surface runoff is slow.

Flooding and wetness are the major hazards in the use and management of these soils. Wakeland soils are suited to most crops commonly grown in the county if an adequate drainage system is established and maintained.

Representative profile of Wakeland silt loam in a cultivated field at a point 330 feet west and 100 feet north of the southeast corner of SE¼ sec. 4, T. 1 N., R. 5 W.:

Ap—0 to 8 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; friable; neutral; abrupt, smooth boundary.

B21g—8 to 18 inches, grayish-brown (10YR 5/2) silt loam; many, fine, faint mottles of brown (10YR 5/3) and common, medium, distinct mottles of light brownish gray (10YR 6/2); weak, fine, granular structure; friable; few, small, yellowish-red (5YR 4/6) iron and manganese concretions; neutral; clear, smooth boundary.

B22g—18 to 30 inches, grayish-brown (10YR 5/2) silt loam; many, medium, faint mottles of light brownish gray (10YR 6/2) and common, medium, distinct mottles of dark yellowish brown (10YR 4/4); weak, fine and medium, granular structure; friable; few, medium, dark-brown (10YR 3/3) spots and stains; neutral; clear, smooth boundary.

Cg—30 to 50 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, distinct mottles of light brownish gray (10YR 6/2) and gray (10YR 6/1); massive; friable; few, fine, brown (10YR 5/3) concretions; neutral.

The Ap horizon ranges from dark grayish brown to brown in color. The B horizon ranges from gray or grayish brown to brown. This horizon contains many gray and yellowish-brown mottles. It ranges from medium acid to neutral. The C horizon ranges from light silty clay loam to silt loam and contains strata of loam, sandy loam, or light sandy clay loam in some areas. It is slightly acid to neutral.

Wakeland soils are similar to Petrolia and Stendal soils. They differ from Petrolia soils because they do not contain so much clay in their subsoil. They differ from Stendal soils because they are slightly acid or neutral.

Wakeland silt loam (0 to 2 percent slopes) (Wa).—This soil is on bottom lands along small streams and along White River. Surface runoff is slow. Included with this soil in mapping are small areas of soils that have a loam surface layer.

This soil is suited to most crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, meadow, and pasture. Alfalfa and small grain are subject to severe damage during periods of prolonged flooding. Wetness is a limitation and flooding a hazard. Most areas along the West Fork of the White River have been protected by levees, but during periods of high water in winter and early in spring, seepage through levees causes some flooding. (Capability unit IIw-7; woodland suitability group 2w13)

Wellston Series

The Wellston series consists of deep, well-drained, strongly sloping to steep soils that formed in a thin layer

of loess and in material weathered from sandstone and shale on uplands. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is silt loam about 6 inches thick. The upper part of this layer is very dark grayish brown, and the lower part is brown. The subsoil is about 28 inches thick. The upper 12 inches of the subsoil is yellowish-brown and strong-brown, friable silt loam and light silty clay loam. The lower part is yellowish-brown, firm silty clay loam. The underlying material is yellowish-brown and pale-brown heavy silt loam. Sandstone and shale are at a depth of about 42 inches.

Wellston soils are moderate in organic-matter content. The surface layer is strongly acid or very strongly acid unless limed. These soils are moderately permeable and have a high available water capacity. Surface runoff is rapid or very rapid.

Runoff and erosion are the major hazards in the use and management of these soils.

Representative profile of Wellston silt loam, 18 to 25 percent slopes, in a wooded area at a point 600 feet north and 30 feet west of the southeast corner of NE¼ sec. 12, T. 5 N., R. 5 W.:

O—1 inch to 0, partly decomposed leaf litter.
A1—0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; many fibrous roots; strongly acid; clear, smooth boundary.
A2—2 to 6 inches, brown (10YR 4/3) silt loam; weak, medium, platy structure breaking to weak, fine, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.
B1—6 to 10 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine, subangular blocky structure; friable; common roots; very strongly acid; clear, smooth boundary.
B21t—10 to 18 inches, strong-brown (7.5YR 5/6) light silty clay loam; moderate, fine and medium, subangular blocky structure; friable; few, thin, reddish-brown (5YR 4/4) clay films; very strongly acid; clear, smooth boundary.
IIB22t—18 to 34 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm; thin, reddish-brown (5YR 4/4) clay films on faces of peds; few partly weathered sandstone fragments, becoming more numerous with depth; very strongly acid; clear, smooth boundary.
IIC—34 to 42 inches, yellowish-brown (10YR 5/6) and pale-brown (10YR 6/3) heavy silt loam; contains enough sand to have a gritty feel; massive; friable; few reddish-brown (5YR 4/3) clay films in crack fillings; 40 percent sandstone fragments; very strongly acid.
R—42 inches, sandstone and shale bedrock.

The A1 horizon ranges from very dark gray to very dark grayish brown. Where these soils are cultivated, the Ap horizon ranges from dark grayish brown to dark brown or brown. The B2 horizon ranges from 18 to 30 inches in thickness and from yellowish brown to strong brown in color. Depth to bedrock ranges from 36 to 60 inches.

Wellston soils are similar to Zanesville and Alford soils. They have a thinner loess cap than Zanesville and Alford soils, and they lack the fragipan of Zanesville soils.

Wellston silt loam, 12 to 18 percent slopes, eroded (WeD2).—This soil is on side slopes below ridgetops. It has a profile similar to that described as representative for the series, but it has lost 4 to 6 inches of the original surface layer through erosion. Surface runoff is rapid. Included with this soil in mapping are a few small areas of slightly eroded soils in woods or permanent pasture and a few areas of moderately sloping soils. Also included are a few small areas of soils that are severely eroded.

This soil is suited to small grain, meadow, and pasture. Runoff and erosion are the major hazards. (Capability unit IVe–3; woodland suitability group 3o10)

Wellston silt loam, 12 to 18 percent slopes, severely eroded (WeD3).—This soil is on side slopes of drainageways and on short slopes below ridgetops. It has a profile similar to that described as representative for the series, but it has lost 6 to 8 inches of the original surface layer through erosion. Surface runoff is very rapid. Included with this soil in mapping are a few small areas that are gullied. Also included are small areas of moderately sloping soils.

This soil is suited to pasture or permanent vegetation. Runoff and erosion are the major hazards. (Capability unit VIe–1; woodland suitability group 3o10)

Wellston silt loam, 18 to 25 percent slopes (WeE).—This soil is on sides of natural draws and ridgetops. It has the profile described as representative for the series. Surface runoff is rapid. Included with this soil in mapping are a few small areas that have a thinner combined surface layer and subsoil and are shallower to bedrock than this Wellston soil. Also included are a few small areas of severely eroded soils.

This soil is suited to permanent pasture or woodland. Runoff and erosion are the major hazards. (Capability unit VIe–1; woodland suitability group 3o10)

Wellston silt loam, 25 to 35 percent slopes (WeF).—This soil is on sides of natural draws. It has a profile similar to that described as representative for the series, but the depth to bedrock is as little as 36 inches in some places. Surface runoff is rapid. Included with this soil in mapping are small areas of soils that are severely eroded.

This soil is suited to woodland and permanent vegetation. Steep slopes and the severe hazard of erosion limit use for crops. Runoff and erosion are the major hazards. (Capability unit VIe–1; woodland suitability group 3o10)

Zanesville Series

The Zanesville series consists of deep, well-drained, gently sloping to strongly sloping soils that formed in about 36 inches of loess and in material weathered from sandstone and shale bedrock on uplands. A firm and brittle fragipan is at a depth of about 31 inches. The native vegetation was mixed hardwood forest.

In a representative profile, the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is brown silt loam about 3 inches thick. The subsoil is about 45 inches thick. The upper 22 inches of the subsoil is dark-brown and strong-brown, firm light silty clay loam, and the lower 23 inches is a yellowish-brown, very firm and brittle silt loam and loam fragipan. The underlying material, extending to a depth of 60 inches, is yellowish-brown loam to silt loam that contains many sandstone fragments.

Zanesville soils are moderate in organic-matter content. The surface layer is strongly acid unless limed. These soils are very slowly permeable and have a moderate available water capacity. Surface runoff is medium or rapid.

Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations, in the use and management of these soils.

Representative profile of Zanesville silt loam, 6 to 12 percent slopes, eroded, in a cultivated field at a point 581 feet south and 50 feet west of the northeast corner of SE¼ sec. 24, T. 5 N., R. 5 W.:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine and medium, granular structure; friable; medium acid; abrupt, smooth boundary.

A2—6 to 9 inches, brown (10YR 5/3) silt loam; weak, medium, granular structure; friable; very strongly acid; gradual, smooth boundary.

B1—9 to 14 inches, strong-brown (7.5YR 5/6) silt loam; weak to moderate, medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

B21t—14 to 25 inches, dark-brown (7.5YR 4/4) light silty clay loam; moderate, medium, subangular blocky structure; firm; thin, dark reddish-brown (5YR 3/4) clay films on faces of peds; very strongly acid; clear, smooth boundary.

B22t—25 to 31 inches, strong-brown (7.5YR 5/6) light silty clay loam; moderate, medium and coarse, subangular blocky structure; firm; thin, reddish-brown (5YR 4/3) clay films on most faces of peds; very strongly acid; clear, smooth boundary.

Bx1—31 to 42 inches, yellowish-brown (10YR 5/4 or 5/6) silt loam; weak, coarse, prismatic structure parting to moderate, coarse, subangular blocky structure; very firm; brittle; thick, brown (10YR 4/3) clay films on some faces of peds; light brownish-gray (10YR 6/2) and light-gray (10YR 7/2) silt coatings on faces of peds and in vertical crack fillings; very strongly acid; clear, smooth boundary.

IIBx2—42 to 54 inches, yellowish-brown (10YR 5/6) silt loam and enough partially decomposed sandstone fragments to have a gritty feel; weak, very coarse, prismatic structure; very firm; brittle; thin, brown (10YR 5/3) clay films in some cracks; gray (10YR 7/1) silt coating in vertical cracks; very strongly acid; gradual, diffuse boundary.

IIC—54 to 60 inches, yellowish-brown (10YR 5/6) loam to silt loam; contains many sandstone fragments and has a gritty feel; massive; friable; very strongly acid.

The Ap horizon ranges from dark grayish brown to brown in color. The fragipan ranges from 18 to 30 inches in thickness and from loam to light clay loam in texture. The depth to the fragipan ranges from 26 to 34 inches. The loess mantle is 24 to 48 inches thick over material weathered from sandstone and shale. The C horizon ranges from loam to light clay loam and is very strongly acid to strongly acid. Depth to acid sandstone and shale bedrock ranges from 48 to 72 inches.

Zanesville soils are similar to Wellston and Cincinnati soils. They differ from Wellston soils because they have a fragipan and have a thicker loess cap. They differ from Cincinnati soils because they formed in loess and material weathered from sandstone and shale bedrock, whereas Cincinnati soils formed in loess and till.

Zanesville silt loam, 2 to 6 percent slopes, eroded (ZaB2).—This soil is on narrow ridgetops. It has had from 3 to 5 inches of the original surface layer removed by erosion. The plow layer is a mixture of the original surface layer and a moderate amount of the brown subsoil. Surface runoff is medium. Included with this soil in mapping are small areas of moderately well drained, nearly level and gently sloping soils. Also included are small areas of soils that are severly eroded.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the downward movement of roots and water. Runoff and erosion are hazards, and the very slowly permeable fragipan and the moderate available water capacity are limitations. Wetness early in spring caused by perching of water above the fragipan commonly results in some delay in spring farming operations. During years of below-average or poorly distributed rainfall, crops are subject to damage from drought. Careful management is required to control erosion in cultivated fields. (Capability unit IIe-7; woodland suitability group 3d9)

Zanesville silt loam, 6 to 12 percent slopes, eroded (ZaC2).—This soil is on the sides of natural draws and on uniform slopes below ridgetops. It has the profile described as representative for the series. It has lost 3 to 5 inches of the original surface layer through erosion, and the plow layer is a mixture of the original surface layer and a moderate amount of the brown subsoil. Surface runoff is medium. Included with this soil in mapping are small areas of severely eroded soils.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Alfalfa and other deep-rooted crops do not grow well, because the fragipan restricts the downward movement of roots and water. Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. Careful management is required to control erosion in cultivated fields. (Capability unit IIIe-7; woodland suitability group 3d9)

Zanesville silt loam, 6 to 12 percent slopes, severely eroded (ZaC3).—This soil is on the sides of natural draws and on uniform slopes below ridgetops. It has a profile similar to that described as representative for the series, but it has lost from 6 inches to all of the original surface layer through erosion. The plow layer is mainly material from the brown subsoil. Surface runoff is rapid. Included with this soil in mapping are small areas of strongly sloping soils.

This soil is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the downward movement of roots and water. Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations. Seedbeds are more difficult to prepare and tend to become cloddy, which results in poorer stands. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. Careful management is required to control erosion in cultivated fields. Crops respond well to lime and fertilizer. (Capability unit IVe-7; woodland suitability group 3d9)

Zanesville silt loam, 12 to 18 percent slopes, eroded (ZaD2).—This soil is on the sides of natural draws. It has a profile similar to that described as representative for the series, but it has a less well-developed fragipan. From 3 to 5 inches of the original surface layer has been removed through erosion. The plow layer is mostly the original surface layer but contains a moderate amount of the brown subsoil. Surface runoff is rapid. Included with this soil in mapping are small areas of severely eroded soils.

This soil is suited to small grain, meadow, and pasture. The severe hazard of erosion limits use for row crops. Alfalfa and other deep-rooted crops do not grow well, because the fragipan restricts the downward movement of

roots and water. Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations. During years of below-average or poorly distributed rainfall, crops are subject to damage from drought. (Capability unit IVe–7; woodland suitability group 3d9)

Zanesville silt loam, 12 to 18 percent slopes, severely eroded (ZaD3).—This soil is on the sides of natural draws. It has a profile similar to that described as representative for the series, but it has a less well developed fragipan and is severely eroded. It has lost 5 to 9 inches of the original surface layer through erosion. The plow layer consists mostly of strong-brown subsoil material but contains a moderate amount of the original surface layer. Surface runoff is very rapid. Included with this soil in mapping are small areas of soils that are deeply gullied.

This soil is suited to meadow and pasture. The severe hazard of erosion limits use for row crops. The soil is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the downward movement of roots and water. Runoff and erosion are hazards, and the very slowly permeable fragipan and moderate available water capacity are limitations. During years when rainfall is below average or poorly distributed, crops are subject to damage from drought. (Capability unit VIe–1; woodland suitability group 3d9)

Zipp Series

The Zipp series consists of deep, very poorly drained, nearly level soils that formed in lacustrine material in depressions on terraces. The native vegetation was mixed swamp forest and swamp grasses.

In a representative profile, the surface layer is very dark grayish-brown silty clay loam about 9 inches thick. The subsoil is mottled, gray and dark-gray, very firm silty clay about 25 inches thick. The underlying material, extending to a depth of 50 inches, is mottled, gray silty clay.

Zipp soils are high in organic-matter content. The surface layer is neutral or slightly acid unless limed. These soils are very slowly permeable and have a high available water capacity. Surface runoff is very slow or ponded.

Wetness is the major limitation in the use and management of these soils. Zipp soils are suited to most crops commonly grown in the county if a suitable drainage system is established and maintained.

Representative profile of Zipp silty clay loam in a cultivated field at a point 150 feet north and 100 feet west of the southeast corner of SE¼ sec. 2, T. 3 N., R. 7 W.:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) silty clay loam, dark gray (10YR 4/1) crushed; weak, coarse, granular structure; firm; neutral; abrupt, smooth boundary.

B21g—9 to 17 inches, dark-gray (10YR 4/1) silty clay; common, fine, distinct mottles of dark brown (7.5YR 4/4); weak, medium, prismatic structure parting to moderate, coarse, angular blocky structure; very firm; neutral; clear, wavy boundary.

B22g—17 to 34 inches, gray (10YR 5/1) silty clay; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); weak, medium, prismatic structure parting to moderate, coarse, angular blocky structure; very firm; dark-gray (10YR 4/1) clay films on faces of peds and in crack fillings; mildly alkaline; gradual, wavy boundary.

Cg—34 to 50 inches, gray (10YR 6/1) silty clay; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); massive; very firm; dark-gray (10YR 4/1) crack fillings; moderately alkaline.

The Ap horizon ranges from dark grayish brown to dark gray in color. The B2 horizon ranges from dark gray to gray. The C horizon is silty clay or clay, but thin layers of silty clay loam, clay loam, and an occasional layer of sandy clay loam are in some areas.

Zipp soils are similar to Kings and Montgomery soils. They have a thinner, lighter colored A horizon than those soils.

Zipp silty clay loam (0 to 2 percent slopes) (Zp).—This soil is in depressional areas on terraces. It has the profile described as representative for the series. Surface runoff is very slow or ponded. Included with this soil in mapping are small areas of soils that have a silty clay surface layer.

This soil is suited to most crops commonly grown in the county if a suitable drainage system is installed and maintained. It is used mainly for corn, soybeans, meadow, and pasture. Small grain crops are subject to severe damage from wetness and flooding during winter and early in spring. Wetness is the major limitation, and maintenance of tilth is a concern of management. (Capability unit IIIw–2; woodland suitability group 2w11)

Zipp silty clay loam, overwash (0 to 2 percent slopes) (Zs).—This soil is in depressional areas on terraces. It has a profile similar to that described as representative for the series, but it has had from 8 to 16 inches of dark grayish-brown light silty clay loam deposited on the original surface layer. Surface runoff is very slow or ponded.

This soil is suited to most crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, meadow, and pasture. Alfalfa and small grain crops are subject to severe damage from wetness and flooding during winter and early in spring. Wetness is the major limitation. (Capability unit IIIw–2; woodland suitability group 2w11)

Use and Management of the Soils

This section has five parts. The first part discusses the management of soils used for crops and pasture and gives the capability grouping and predicted yields of the principal crops. The second part discusses the use and management of soils for woodland; the third part deals with the use of soils for wildlife; and the fourth part discusses the use of soils for development of recreational areas. The fifth part deals with soil properties that affect engineering uses of the soils.

Crops and Pasture

About 75 percent of Daviess County is cultivated. The grain crops are corn, soybeans, and wheat. The principal forage crops are red clover, alfalfa, and grass. Melons, orchards, and vegetable crops also are grown on a small acreage.

The main concerns of management of cultivated soils in the county are controlling water erosion, establishing drainage systems, and maintaining fertility.

Among the measures that help to control erosion and runoff are contour cultivation, terracing, grassing waterways, stripcropping, minimum tillage, using crop residue, and growing green-manure crops and grass and legume crops. Generally, a combination of several measures is used.

The measures used for drainage are tile and shallow surface drains.

Among the measures that help to maintain fertility are the application of lime and fertilizer. In addition, minimum tillage and use of crop residue and green-manure crops help to maintain a favorable organic-matter content and good tilth.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering.

In the capability system, the kinds of soil are grouped at three levels: the capability class, the subclass, and the unit. These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

- Class I soils have few limitations that restrict their use.
- Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
- Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.
- Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.
- Class V soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife habitat. (None in Daviess County)
- Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, range, woodland, or wildlife habitat.
- Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture, range, woodland, or wildlife habitat.
- Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat or water supply, or to esthetic purposes. (None in Daviess County)

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-1 or IIIe-11. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Capability units are generally assigned locally but are part of a statewide system. All of the units of the system are not represented in Daviess County; therefore, the capability unit numbers in this soil survey are not consecutive.

In the following pages, the capability units in Daviess County are described, and suggestions for the use and management of the soils are given. The names of the soil series represented in each unit are given, but this does not mean that all soils of the series named are in that particular unit. To find the capability unit designation of any specific soil, refer to the "Guide to Mapping Units" at the back of this survey.

CAPABILITY UNIT I-1

Only Iona silt loam, 0 to 2 percent slopes, is in this unit. This is a deep, moderately well drained soil on uplands. It has a silt loam surface layer and a silty clay loam subsoil. Organic-matter content is moderate, and natural fertility is low. The surface layer is medium acid unless limed. The available water capacity is high, and permeability is moderately slow.

No serious hazards affect use and management of this soil. The major management requirements are maintaining the organic-matter content and fertility and improving or maintaining good tilth. Use of minimum tillage, crop residue, and green-manure crops helps to improve or maintain organic-matter content.

The soil in this unit is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture.

CAPABILITY UNIT I-2

This unit consists of soils of the Armiesburg, Cuba, Haymond, Nolin, and Ross series. These are deep, well-drained soils on bottom lands. They have a medium-textured and moderately fine textured surface layer and subsoil. Organic-matter content is generally moderate, but it is high in Armiesburg and Ross soils. The surface layer is generally slightly acid or neutral, but it is strongly acid in Cuba soils unless limed. Permeability is moderate in most of the soils, but it is moderately slow in Armiesburg soils. The available water capacity is high.

Occasional flooding is a hazard in the use and management of these soils. Most areas along the West Fork of the White River are protected by levees, but during periods of high water, seepage through levees causes some damage. Use of crop residue and green-manure crops helps to improve and maintain organic-matter content. Liming is needed on Cuba soils to maintain a favorable reaction in the surface layer.

The soils in this unit are suited to all crops commonly grown in the county. They are used mainly for corn and soybeans. Alfalfa and small grain crops are subject to damage during periods of prolonged flooding. Dikes and levees help to prevent damage from occasional flooding.

CAPABILITY UNIT IIe-1

The only soil in this unit is Parke silt loam, 2 to 6 percent slopes, eroded. This is a deep, well-drained soil on uplands. It has a medium-textured surface layer and a moderately fine textured subsoil. Organic-matter content is moderate, and natural fertility is low. The surface layer is strongly acid unless limed. The available water capacity is high, and permeability is moderate.

Runoff and erosion are hazards in the use and management of this soil. The major management requirements are maintaining organic-matter content and fertility, improving and maintaining good tilth, and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to improve and maintain organic-matter content and good tilth. These practices, along with use of terraces, contour farming, and grassed waterways, help to control runoff and erosion.

The soil in this unit is suited to all crops commonly grown in the county. It is used mainly for corn, small grain, meadow, and pasture.

CAPABILITY UNIT IIe-3

This unit consists of soils of the Alford and Iona series. These are deep, well drained and moderately well drained, gently sloping soils on uplands. They have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. Organic-matter content and natural fertility are moderate. The surface layer is strongly acid or medium acid unless limed. The available water capacity is high, and permeability is moderately slow or moderate.

Runoff and erosion are hazards in the use and management of these soils. The major management requirements are maintaining organic-matter content and fertility, improving and maintaining good tilth, and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to improve and maintain organic-matter content and good tilth. These practices, along with use of terraces, contour farming, and grassed waterways, help to control runoff and erosion.

The soils in this unit are suited to all crops commonly grown in the county. They are used mainly for corn, soybeans, small grain, meadow, and pasture.

CAPABILITY UNIT IIe-7

This unit consists of soils of the Cincinnati, Hosmer, and Zanesville series. These are deep, well-drained, gently sloping soils on uplands. They have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. Organic-matter content is low to moderate, and natural fertility is low. The surface layer is strongly acid unless limed. A very slowly permeable fragipan is at a depth of 22 to 34 inches. This pan restricts the downward movement of water and roots and limits the available water capacity to low or moderate.

Runoff and erosion are hazards in the use and management of these soils. The major management requirements are maintaining organic-matter content and fertility, improving and maintaining good tilth, and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to maintain or improve organic-matter content and tilth. These practices, along with use of terraces, contour farming, and grassed waterways, help to control runoff and erosion.

The soils in this unit are suited to most crops commonly grown in the county. They are used mainly for corn, soybeans, small grain, meadow, and pasture. They are not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts the depth of root and water penetration. In years of below-normal rainfall or poor rainfall distribution, crops are subject to damage from drought. Early in spring, wetness caused by perching of water above the fragipan commonly causes some delay in farming operations.

CAPABILITY UNIT IIe-11

Only Princeton fine sandy loam, 2 to 6 percent slopes, eroded, is in this unit. This is a deep, well-drained soil on uplands. It has a moderately coarse textured surface layer and a moderately coarse textured and moderately fine textured subsoil. Organic-matter content is low, and the surface layer is medium acid unless limed. The available water capacity is moderate, and permeability is moderate.

Erosion is a hazard and the moderate available water capacity is a limitation in the use and management of this soil. The major management requirements are maintaining organic-matter content and fertility and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to improve and maintain organic-matter content and good tilth. These practices, along with use of contour farming, terraces, and grassed waterways, help to control erosion.

The soil in this unit is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. Alfalfa and orchards are also well suited. During years of below-average rainfall or poor rainfall distribution, crops are subject to damage from drought.

CAPABILITY UNIT IIe-12

The only soil in this unit is Iva silt loam, 2 to 4 percent slopes, eroded. This is a deep, somewhat poorly drained

soil. It has a medium-textured surface layer and a moderately fine textured subsoil. Organic-matter content and natural fertility are low. The surface layer is medium acid unless limed. The available water capacity is high, and permeability is slow.

Wetness is a limitation and erosion is a hazard in the use and management of this soil. The major management requirements are maintaining organic-matter content and fertility, improving and maintaining good tilth, providing adequate drainage, and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to improve and maintain organic-matter content and good tilth. These practices, along with use of contour farming and grassed waterways, help to control erosion.

The soil in this unit is suited to all crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, small grain, meadow, and pasture.

CAPABILITY UNIT IIw-1

This unit consists of soils of the Lyles, Ragsdale, and Vincennes series. These are deep, very poorly drained, nearly level soils on uplands and terraces. They have a moderately coarse textured, medium-textured, or moderately fine textured surface layer and subsoil. Organic-matter content is moderate or high, and the surface layer is neutral to medium acid. The available water capacity is high, and permeability is moderate or slow.

Wetness is the major limitation in the use and management of these soils. Maintaining good tilth is a concern on the moderately fine textured soils. Large clods that are very difficult to work down when dry are likely to form if these soils are tilled when too wet or dry. Use of minimum tillage and crop residue, along with working the moderately fine textured soils at a favorable moisture content, helps to maintain good tilth. Crops respond well to fertilizer.

The soils in this unit are suited to all crops commonly grown in the county if a suitable drainage system is established and maintained. Alfalfa is subject to frost heave during winter and early in spring.

CAPABILITY UNIT IIw-2

This unit consists of soils of the Iva and Reesville series. These are deep, somewhat poorly drained, nearly level soils on uplands. They have a medium-textured surface layer and a moderately fine textured subsoil. Organic-matter content is low or moderate, and natural fertility is low. The surface layer is medium acid unless limed. The available water capacity is high, and the permeability is slow.

Wetness is the major limitation in the use and management of these soils. The major management requirements are maintaining organic-matter content and fertility, improving and maintaining good tilth, and providing adequate drainage. Use of minimum tillage, crop residue, and green-manure crops helps to improve and maintain organic-matter content and good tilth.

The soils in this unit are suited to all crops commonly grown in the county if a suitable drainage system is established and maintained. They are used for corn, soybeans, small grain, meadow, and pasture.

CAPABILITY UNIT IIw-5

The only soil in this unit is Hosmer silt loam, 0 to 2 percent slopes. This is a deep, well-drained soil on uplands. It has a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. Organic-matter content and natural fertility are low. The surface layer is strongly acid unless limed. A very slowly permeable fragipan is at a depth of 22 to 34 inches. This restricts the downward movement of water and roots and limits the available water capacity to moderate. This soil is wetter for a longer period in spring than surrounding soils that are well drained.

The major management requirements are maintaining organic-matter content and fertility and improving and maintaining good tilth. Use of minimum tillage, crop residue, and green-manure crops helps to improve or maintain organic-matter content and good tilth.

The soil in this unit is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts penetration of roots and water. In years of below-normal rainfall or poor rainfall distribution, crops are subject to damage from drought. Early in spring, wetness caused by perching of water above the fragipan commonly causes some delay in farming operations.

CAPABILITY UNIT IIw-7

This unit consists of soils of the Petrolia, Stendal, and Wakeland series. These are deep, poorly drained and somewhat poorly drained, nearly level soils on bottom lands. They have a medium-textured and moderately fine textured surface layer and subsoil. The organic-matter content is low or moderate, and the available water capacity is high. The surface layer is generally neutral or slightly acid, but it is strongly acid in Stendal soils unless limed. Permeability is generally moderate, but it is moderately slow in Petrolia soils.

Flooding and wetness are the major hazards in the use and management of these soils. Most areas along the West Fork of the White River are protected by levees, but during periods of high water in winter and early in spring, seepage through levees causes some flooding. Use of minimum tillage, crop residue, and green-manure crops helps to improve or maintain organic-matter content and good tilth.

The soils in this unit are suited to most crops commonly grown in the county if an adequate drainage system is established and maintained. Alfalfa and small grain are subject to severe damage during periods of prolonged flooding.

CAPABILITY UNIT IIs-2

This unit consists only of Elston loam. This is a deep, well-drained, nearly level soil on terraces. It has a medium-textured surface layer and a moderately coarse textured to moderately fine textured subsoil. Organic-matter content is high, and natural fertility is moderate. The available water capacity and permeability are moderate.

Droughtiness during years of below-average rainfall or poor rainfall distribution is a major limitation in the use and management of this soil. Use of minimum tillage and crop residue and planting early in spring help to overcome the potential damage to crops from drought. Liming helps

to maintain a favorable reaction in the surface layer. Crops respond well to fertilizer.

The soil in this unit is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. It is also well suited to irrigated vegetable crops in areas where an adequate water supply is available.

CAPABILITY UNIT IIs-5

The only soil in this unit is Princeton fine sandy loam, 0 to 2 percent slopes. This is a deep, well-drained soil on uplands. It has a moderately coarse textured surface layer and a moderately coarse textured and moderately fine textured subsoil. Organic-matter content and natural fertility are moderate. The surface layer is medium acid unless limed. The available water capacity is moderate, and permeability is moderate.

During years of below-average rainfall or poor rainfall distribution, crops are subject to damage from drought. Use of minimum tillage, crop residue, and green-manure crops helps to increase or maintain organic-matter content. Planting early in spring helps to overcome potential crop damage from drought. Liming helps to maintain a favorable reaction in the surface layer. Crops respond well to fertilizer.

CAPABILITY UNIT IIIe-1

Only Parke silt loam, 6 to 12 percent slopes, eroded, is in this unit. This is a deep, well-drained soil on uplands. It has a medium-textured surface layer and a moderately fine textured subsoil. Organic-matter content is moderate, and natural fertility is low. The surface layer is strongly acid unless limed. The available water capacity is high, and peameability is moderate.

Runoff and erosion are hazards in the use and management of this soil. The major management requirements are maintaining organic-matter content and fertility, improving and maintaining good tilth, and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to improve and maintain organic-matter content and good tilth. These practices, along with use of contour farming, terracing, and grassed waterways, help to control erosion and runoff.

The soil in this unit is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture.

CAPABILITY UNIT IIIe-3

This unit consists of soils of the Alford series. These are deep, well-drained, gently sloping and moderately sloping soils on uplands. They have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. The gently sloping soils are severely eroded, and the moderately sloping soils are moderately eroded. Organic-matter content is moderate, and natural fertility is low. The surface layer is medium acid unless limed. The available water capacity is high, and permeability is moderate.

Runoff and erosion are hazards in the use and management of these soils. The major management requirements are maintaining organic-matter content and fertility, improving and maintaining good tilth, and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to improve and maintain organic-matter content and good tilth. These practices, along with use of contour farming, terraces, and grassed waterways, help to control erosion and runoff.

The soils in this unit are suited to all crops commonly grown in the county. They are used mainly for corn, soybeans, small grain, meadow, and pasture.

CAPABILITY UNIT IIIe-7

This unit consists of soils of the Cincinnati, Hosmer, and Zanesville series. These are deep, well-drained, gently sloping and moderately sloping soils on uplands. They have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. The gently sloping soils are severely eroded, and the moderately sloping soils are slightly or moderately eroded. Organic-matter content is low to moderate, and natural fertility is low. The surface layer is strongly acid unless limed. A very slowly permeable fragipan is at a depth of 22 to 34 inches. This pan restricts the downward movement of water and limits the available water capacity to low or moderate.

Runoff and erosion are hazards in the use and management of these soils. The major management requirements are maintaining organic-matter content and fertility, improving and maintaining good tilth, and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to improve and maintain organic-matter content and good tilth. These practices, along with use of terraces, contour farming, stripcropping, and grassed waterways, help to control erosion and runoff.

The soils in this unit are suited to most crops commonly grown in the county. They are used mainly for corn, soybeans, small grain, meadow, and pasture. They are not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts root and water penetration. In years of below-normal rainfall or poor rainfall distribution, crops are subject to damage from drought.

CAPABILITY UNIT IIIe-11

The only soil in this unit is Markland silt loam, 2 to 6 percent slopes, eroded. This is a deep, well-drained soil on lakebeds. It has a medium-textured surface layer and a moderately fine textured and fine-textured subsoil. Organic-matter content is low, and the surface layer is strongly acid unless limed. Permeability is slow, and available water capacity is high.

Runoff and erosion are hazards and the slowly permeable subsoil is a limitation in the use and management of this soil. The major management requirements are maintaining organic-matter content and fertility, improving and maintaining good tilth, and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to improve and maintain organic-matter content and good tilth. These practices, along with use of terraces, contour farming, and grassed waterways, help to control erosion and runoff.

The soil in this unit is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture.

CAPABILITY UNIT IIIe-12

The only soil in this unit is Bloomfield loamy fine sand, 6 to 12 percent slopes. This is a deep, somewhat excessively drained soil on uplands. It has a coarse-textured surface layer and subsoil. Organic-matter content is moderate, and

natural fertility is low. The surface layer is medium acid unless limed. Permeability is rapid, and the available water capacity is low.

Erosion is a hazard and the low available water capacity is a limitation in the use and management of this soil. The major management requirements are improving and maintaining organic-matter content and fertility, protecting crops from drought, and controlling erosion. Use of minimum tillage, crop residue, green-manure crops, and cover crops improves and helps to maintain organic-matter content. This also helps to overcome the potential damage to crops from drought. Contour cultivation helps to control erosion.

The soil in this unit is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, melons, and meadow. It is also well suited to apples and peaches. During years of below-average rainfall or poor rainfall distribution, crops are subject to damage from drought.

CAPABILITY UNIT IIIe-15

Only Princeton fine sandy loam, 6 to 12 percent slopes, eroded, is in this unit. This is a deep, well-drained soil on uplands. It has a moderately coarse textured surface layer and a moderately coarse textured and moderately fine textured subsoil. Organic-matter content is moderate, and natural fertility is low. The surface layer is medium acid unless limed. Permeability is moderate, and the available water capacity is moderate.

Runoff and erosion are hazards and the moderate available water capacity is a limitation in the use and management of this soil. The major management requirements are improving and maintaining organic-matter content and fertility and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to maintain or improve organic-matter content. Use of contour farming, terraces, and grassed waterways helps to control erosion.

The soil in this unit is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. During years of below-average rainfall or poor rainfall distribution, crops are subject to damage from drought.

CAPABILITY UNIT IIIw-2

This unit consists of soils of the Kings, Montgomery, and Zipp series. These are deep, very poorly drained, nearly level soils on lakebeds. They have a moderately fine textured and fine textured surface layer and a fine-textured subsoil. Organic-matter content is high, and natural fertility is moderate. The surface layer is neutral or slightly acid unless limed. Permeability is very slow, and the available water capacity is high.

Wetness and the very slowly permeable subsoil are the major limitations in the use and management of these soils. Flooding and surface ponding are hazards in some areas. The major management requirements are providing adequate drainage, maintaining a high level of fertility, and improving and maintaining good tilth. Large clods that are very difficult to work down when dry are likely to form if these soils are plowed when too wet or too dry. Use of minimum tillage, fall plowing, and crop residue, along with working these soils at a favorable moisture content, helps to maintain good tilth.

The soils in this unit are suited to most crops commonly grown in the county if an adequate drainage system is established and maintained. They are used mainly for corn, soybeans, and meadow. Small grain is subject to damage from the high water table in winter and early in spring.

CAPABILITY UNIT IIIw-3

This unit consists of soils of the Bartle and Vigo series. These are deep, somewhat poorly drained, nearly level and gently sloping soils on uplands and lakebeds. They have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. Organic-matter content and natural fertility are low. The surface layer is strongly acid unless limed. Permeability is very slow, and the available water capacity is low to high.

Wetness and the very slowly permeable subsoil are the major limitations, but erosion is a hazard on the gently sloping soils. The major management requirements are improving and maintaining organic-matter content and fertility, improving and maintaining good tilth, establishing a suitable drainage system, and controlling erosion on the gently sloping soils. Use of minimum tillage, crop residue, and green-manure crops helps to improve or maintain organic-matter content and good tilth. These practices, along with use of contour farming and grassed waterways, help to control erosion on gently sloping soils.

The soils in this unit are suited to most crops commonly grown in the county if an adequate drainage system is established and maintained. They are used mainly for corn, soybeans, small grain, meadow, and pasture. They are not well suited to alfalfa and other deep-rooted crops, because the very slowly permeable subsoil restricts downward movement of roots and water.

CAPABILITY UNIT IIIw-4

This unit consists only of Ayrshire fine sandy loam. This is a deep, somewhat poorly drained, nearly level soil on uplands. It has a moderately coarse textured surface layer and a medium-textured and moderately fine textured subsoil. Organic-matter content is moderate. The surface layer is medium acid unless limed. The available water capacity is high, and permeability is moderate.

Wetness is the major limitation in the use and management of this soil. Use of minimum tillage, crop residue, and green-manure crops helps to maintain or improve organic-matter content.

The soil in this unit is suited to all crops commonly grown in the county if an adequate drainage system is established and maintained.

CAPABILITY UNIT IIIw-6

This unit consists only of McGary silt loam. This is a deep, somewhat poorly drained, nearly level soil on lakebeds. It has a medium-textured surface layer and a fine-textured subsoil. Organic-matter content and natural fertility are low. The surface layer is slightly acid or neutral. Permeability is very slow, and available water capacity is high.

Wetness and the slowly permeable subsoil are the major limitations in the use and management of this soil. The major management requirements are establishing adequate drainage, maintaining organic-matter content and fer-

tility, and improving and maintaining good tilth. Use of minimum tillage, crop residue, and green-manure crops helps to maintain or improve organic-matter content and maintain good tilth.

The soil in this unit is suited to all crops commonly grown in the county if an adequate drainage system is established and maintained. It is used mainly for corn, soybeans, small grain, meadow, and pasture.

CAPABILITY UNIT IIIw-10

This unit consists only of Bonnie silt loam. This is a deep, poorly drained, nearly level soil on bottom lands. It has a medium-textured surface layer and subsoil. Organic-matter content is moderate, and natural fertility is low. The surface layer is strongly acid unless limed. Permeability is slow, and the available water capacity is high.

Wetness is a limitation and flooding a hazard in the use and management of this soil. The major management requirements are improving and maintaining organic-matter content and fertility, improving and maintaining good tilth, and establishing adequate drainage. Use of minimum tillage, crop residue, and green-manure crops helps to improve or maintain organic-matter content and good tilth.

The soil in this unit is suited to corn, soybeans, meadow, and pasture if a suitable drainage system (fig. 13) is established and maintained. Small grain and alfalfa crops are subject to severe damage during periods of flooding.

CAPABILITY UNIT IIIw-12

This unit consists only of Peoga silt loam. This is a deep, poorly drained, nearly level soil on lakebeds. It has a medium-textured surface layer and subsoil. Organic-matter content and natural fertility are low. The surface layer is strongly acid unless limed. Permeability is very slow, and the available water capacity is high.

Wetness and the very slowly permeable subsoil are the major limitations in the use and management of this soil. The major management requirements are improving and maintaining organic-matter content, fertility, and good tilth and establishing and maintaining adequate drainage. Use of minimum tillage, crop residue, and green-manure crops helps to improve and maintain organic-matter content and good tilth.

The soil in this unit is suited to most crops commonly grown in the county if a suitable drainage system is established and maintained. It is used mainly for corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa and other deep-rooted crops, because the very slowly permeable subsoil restricts the depth of rooting.

CAPABILITY UNIT IIIs-1

The only soil in this unit is Bloomfield loamy fine sand, 2 to 6 percent slopes. This is a deep, somewhat excessively drained soil on uplands. It has a coarse-textured surface layer and subsoil. Organic-matter content is moderate, and natural fertility is low. The surface layer is medium acid unless limed. Permeability is rapid, and the available water capacity is low.

The low available water capacity is a limitation and erosion is a hazard in the use and management of this soil. The major management requirements are improving and maintaining organic-matter content and fertility, protecting crops from drought, and controlling erosion. Use of minimum tillage, crop residue, and green-manure crops helps to maintain or improve organic-matter content. These practices, along with use of winter cover crops and early planting in spring, help to conserve and make maximum use of moisture. Use of contour farming helps to control erosion.

Figure 13.—Collection ditch in Bonnie silt loam being constructed as part of a shallow surface drainage system.

The soil in this unit is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, melons, meadow, and pasture. During years of below-average rainfall or poor rainfall distribution, crops are subject to severe damage from drought.

CAPABILITY UNIT IVe-1

This unit consists of soils of the Parke series. These are deep, well-drained, moderately sloping and strongly sloping soils on uplands. They have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. Organic-matter content is moderate, and natural fertility is low. The surface layer is strongly acid unless limed. Permeability is moderate, and the available water capacity is high. These soils are underlain at a depth of about 30 inches by sandy, acid, gravelly outwash material that limits use for pond and lake development.

Runoff and erosion are the major hazards in the use and management of these soils. The major management requirements are improving and maintaining organic-matter content and fertility, improving and maintaining good tilth, and controlling erosion. Use of minimum tillage and crop residue helps to improve and maintain organic-matter content and good tilth. These practices, along with use of terraces where slopes are less than 12 percent, contour farming, stripcropping, and waterways, help to control erosion and runoff.

The soils in this unit are suited to small grain, meadow, and pasture. They are also well suited to orchards. The severe hazard of erosion limits use for row crops.

CAPABILITY UNIT IVe-3

This unit consists of soils of the Alford and Wellston series. These are deep, well-drained, moderately sloping and strongly sloping soils on uplands. They have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. The moderately sloping soils are severely eroded, and the sloping soils are eroded. Organic-matter content is moderate, and natural fertility is low. The surface layer is medium acid unless limed. Permeability is moderate, and the available water capacity is high.

Runoff and erosion are the major hazards in the use and management of these soils. The major management requirements are improving and maintaining organic-matter content and fertility, maintaining good tilth, and controlling erosion. Use of minimum tillage and crop residue helps to improve and maintain organic-matter content and good tilth. These practices, along with use of terraces where slopes are less than 12 percent, contour farming, stripcropping, and grassed waterways, help to control erosion and runoff.

The soils in this unit are suited to small grain, meadow, and pasture. They also are well suited to orchards. The severe hazard of erosion limits use for row crops.

CAPABILITY UNIT IVe-7

This unit consists of soils of the Cincinnati, Hosmer, and Zanesville series. These are deep, well-drained, moderately sloping and strongly sloping soils on uplands and lakebeds. They have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. The moderately sloping soils are severely eroded, and the strongly sloping soils are eroded. Organic-matter content is low and moderate, and natural fertility is low. The surface layer is strongly acid unless limed. A very slowly permeable fragipan is at a depth of 22 to 34 inches. This pan restricts the downward movement of water and roots and limits the available water capacity to low or moderate.

Runoff and erosion are hazards in the use and management of these soils. The major management requirements are improving and maintaining organic-matter content and fertility, improving and maintaining good tilth, and controlling erosion. Use of minimum tillage and crop residue helps to improve and maintain organic-matter content and good tilth. These practices, along with use of terraces where slopes are less than 12 percent, contour farming, stripcropping, and grassed waterways, help to control runoff and erosion.

The soils in this unit are suited to small grain, meadow, and pasture. They are not well suited to alfalfa and other deep-rooted crops, because the fragipan restricts root and water penetration. In years of below-average rainfall or poor rainfall distribution, crops are subject to damage from drought.

CAPABILITY UNIT IVe-11

The only soil in this unit is Markland silt loam, 6 to 18 percent slopes, eroded. This is a deep, well-drained soil on lakebeds. It has a medium-textured surface layer and a moderately fine textured and fine-textured subsoil. Organic-matter content and natural fertility are low. The surface layer is strongly acid unless limed. Permeability is slow, and the available water capacity is high.

Runoff and erosion are hazards and the slowly permeable subsoil is a limitation in the use and management of this soil. The major management requirements are maintaining organic-matter content and fertility, improving and maintaining good tilth, and controlling erosion. Use of minimum tillage and crop residue helps to improve and maintain organic-matter content and good tilth. These practices, along with use of contour farming and grassed waterways, help control runoff and erosion.

The soil in this unit is suited to most crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, meadow, and pasture. The severe hazard of erosion limits use for row crops.

CAPABILITY UNIT IVe-12

The only soil in this unit is Bloomfield loamy fine sand, 12 to 18 percent slopes. This is a deep, somewhat excessively drained soil on uplands. It has a coarse-textured surface layer and subsoil. Organic-matter content is moderate, and natural fertility is low. The surface layer is medium acid unless limed. Permeability is rapid, and the available water capacity is low.

Erosion is a hazard and the low available water capacity is a limitation in the use and management of this soil. The major management requirements are improving and maintaining organic-matter content and fertility, protecting crops from drought, and controlling erosion. Use of minimum tillage, crop residue, and green-manure and cover crops help to improve and maintain organic-matter content. This also helps to overcome the potential damage to crops from drought. Contour farming helps to control erosion.

The soil in this unit is suited to all crops commonly grown in the county. It is used mainly for corn, soybeans, small grain, melons, alfalfa, and meadow. It also is well suited to apples and peaches. During years of below-average rainfall or poor rainfall distribution, crops are subject to damage from drought.

CAPABILITY UNIT IVe-15

Only Princeton fine sandy loam, 12 to 18 percent slopes, eroded, is in this unit. This is a deep, well-drained soil on uplands. It has a moderately coarse textured surface layer and a moderately coarse textured and moderately fine textured subsoil. It is slightly or moderately eroded. Organic-matter content is moderate. The surface layer is medium acid unless limed. Permeability is moderate, and the available water capacity is moderate.

Erosion is a hazard and the moderate available water capacity is a limitation in the use and management of this soil. Use of crop residue and green-manure crops improves and helps to maintain organic-matter content. These practices, along with use of minimum tillage and planting early in spring, help to conserve and make maximum use of moisture. Use of minimum tillage, contour farming, and winter cover crops helps to control erosion.

The soil in this unit is suited to small grain, meadow, and pasture. It also is well suited to alfalfa and orchards. An occasional row crop can be grown, but the erosion hazard is severe. During years of below-average rainfall or

poor rainfall distribution, crops are subject to damage from drought.

CAPABILITY UNIT VIe–1

This unit consists of soils of the Alford, Cincinnati, Hickory, Hosmer, Wellston, and Zanesville series. These are deep, well-drained, strongly sloping to steep soils on uplands. They have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. Organic-matter content and natural fertility are low and moderate. The surface layer is medium acid or strongly acid. Permeability is very slow or moderate, and the available water capacity is low to high.

Runoff and erosion are the major hazards in the use and management of these soils. The major management requirements are improving and maintaining organic-matter content and fertility and controlling erosion in areas used for meadow and pasture. A permanent vegetative cover helps to control erosion and runoff. Tillage operations to establish meadow or permanent pasture need to be on the contour to help control erosion. These soils need protection from overgrazing to help avoid serious losses of soil.

Soils that have slopes of less than 18 percent are suited to meadow. Alfalfa and other deep-rooted crops do not grow well on the soils that have a fragipan.

CAPABILITY UNIT VIe–3

The only soil in this unit is Bloomfield loamy fine sand, 18 to 35 percent slopes. This is a deep, somewhat excessively drained soil on uplands. It has a coarse-textured surface layer and subsoil. This soil is slightly or moderately eroded. Organic-matter content is moderate. The surface layer is medium acid unless limed. Permeability is rapid, and the available water capacity is low.

Erosion is a hazard and the low available water capacity is a limitation in the use and management of this soil. A permanent vegetative cover helps to control erosion. Protection from overgrazing on pastures is important.

The soil in this unit is suited to permanent pasture and woodland. During years of below-normal rainfall or poor rainfall distribution, pasture growth generally is poor.

CAPABILITY UNIT VIIe–1

This unit consists of soils of the Berks, Gilpin, Hickory, and Negley series. These are deep and moderately deep, well-drained and somewhat excessively drained, moderately steep to very steep soils on uplands. They have a medium-textured surface layer and a medium-textured to moderately fine textured subsoil. Organic-matter content and natural fertility are low. Permeability is moderate. The available water capacity is generally high, but it is moderate in the Gilpin soils and moderate or low in the Berks soils.

Runoff and erosion are the major hazards in the use and management of these soils. Careful management is needed to prevent overgrazing of pastured areas.

These soils are better suited to permanent pasture or woodland than to crops, because of the steepness of slopes and the severe hazard of erosion.

CAPABILITY UNIT VIIe–3

Strip mines, a miscellaneous land type, is in this unit. It consists of narrow, elongated mounds of mine spoil and a few open pits. Some pits contain water and some are dry. The spoil material consists of heterogeneous soil material, rock, shale, and some fragments of coal. The spoil ranges from very strongly acid to neutral.

Runoff and erosion are the major hazards in the use and management of this land type. Pasture can be established and maintained in areas that are not too steep. Pastures respond well to lime and fertilizer. In areas where the mine spoil is very strongly acid or strongly acid, leaching for a period of 3 to 10 years is commonly needed before revegetation can be accomplished successfully.

The land in this unit is suited to timber production and to natural lakes that provide water for wildlife habitat development or recreation.

Predicted yields

Table 2 lists the average yields per acre of corn, soybeans, wheat, mixed hay, and alfalfa hay that can be expected on each soil in the county under improved management.

The yields are estimated averages for a 5 to 10 year period. They are based on farm records, on interviews with farmers, members of the staff of the Purdue Agricultural Experiment Station, and others familiar with farming in the county, and on direct observation of soil scientists and district conservationists. Considered in making the estimates were the prevailing climate, characteristics of the soils, and the influence of different kinds of management on the soils.

It should be understood that these yield figures do not apply directly to specific tracts of land for any particular year, because the soils vary somewhat from place to place, management practices differ slightly from farm to farm, and weather conditions vary from year to year. Nevertheless, these estimates appear to be as accurate a guide as can be obtained without further detailed and lengthy investigations. They are useful in showing the relative productivity of the soils and how soils respond to improved management.

The following management practices are needed to obtain yields listed in table 2: (a) cropping systems are used that maintain tilth and the organic-matter content, (b) maximum use is made of cultural practices, mechanical practices, or both, needed to control erosion so that the qualities of the soil are maintained or improved rather than reduced, (c) high levels of available phosphate, potassium, and nitrogen are maintained in the soil, levels of fertility are frequently determined by soil test, and high levels are maintained, as recommended by the Purdue Agricultural Experiment Station, (d) soils are tested and limed in accordance with recommendations, (e) crop residue is used to the fullest extent for protection and improvement of the soil, (f) minimum tillage is practiced, (g) only the best adapted crop varieties are used, (h) weeds are thoroughly controlled by tillage, chemicals, or both, and (i) wet soils have been adequately drained so that wetness does not restrict yields.

Woodland [2]

The original cover in Daviess County was mostly hardwood trees. Land clearing progressed rather rapidly, and by 1959 the Conservation Needs Inventory reported that

[2] By JOHN O. HOLWAGER, woodland conservationist, Soil Conservation Service.

the total acreage of woodland in the county was 35,500 acres.

In a number of areas, clearing was performed with little regard for kinds of soil or steepness of slopes, and this resulted in severe erosion and later abandonment of fields because of reduced yields. It has been estimated in the Conservation Needs Inventory that approximately 6,000 acres in the county require reforestation to control erosion and establish a productive woodland crop.

Types of woodland crops

For management purposes the trees in Daviess County can be separated into four major hardwood crops. The crops are named for the dominant tree species, but they vary widely in mixture of trees growing with the major species.

Upland oak.—This is the dominant tree crop in the county, and it is on a large percentage of the moderately well drained and well drained soils on uplands. It is mainly a mixture of white, black, red, scarlet, and chinquapin oaks. Included with the oaks are hickory, ash, sugar maple, and tulip-poplar.

Tulip-poplar.—This crop is generally on the lower parts of the north- and northeast-facing slopes (cool aspects) and in narrow valleys or coves. Tulip-poplar is presently one of the more valuable trees, and the species is generally encouraged in management. Other species commonly occurring with tulip-poplar are white oak, red oak, hickory, beech, ash, black walnut, and sugar maple.

Pin oak.—This crop grows only on somewhat poorly drained to very poorly drained soils of the county. Associated species are red maple, sweetgum, swamp white oaks, ash, and hickory.

Sweetgum.—Sweetgum grows on sites similar to those described for pin oak and generally is the dominant species on abandoned fields. Associated species are red maple, river birch, ash, hickory, and sycamore.

Pine.—Naturally seeded stands of pine are nonexistent in Daviess County. Planted pine stands have been established in the past and will be used in the future on sites not suitable for hardwoods. Species of pine used are Virginia, white, shortleaf, and red.

Woodland suitability groups

To assist landowners in planning the use of their soils for woodland crops, the soils of the county have been placed in 12 woodland suitability groups. A woodland suitability group is made up of soils that are capable of producing similar kinds of wood crops, that need similar management to produce these crops where the existing vegetation is similar, and that have about the same potential productivity.

All soils in Daviess County have been rated in table 3 on the basis of their performance when used for production of wood crops or establishment of new plantings. The "Guide to Mapping Units," at the back of this survey, lists all mapping units and places each in its proper woodland suitability group.

An important item used in grouping the soils is the potential soil productivity, expressed as site index, for woodland crops of upland oak, tulip-poplar, pin oak, sweetgum, white pine, red pine, shortleaf pine, and Virginia pine. Site index indicates the total height attained by the dominant trees at 50 years of age. For example, where the site index is 80 for upland oak, the soil produces dominant oak trees that average 80 feet in height at the age of 50 years.

Published site index curves were used in calculating the average index range for each woodland suitability group. The necessary field data on woodland crops were obtained from numerous field plots taken at sites representative of the soils in the county.

For each woodland suitability group, ratings are given for the limitations and hazards that affect use of the soils for woodland. These limitations and hazards are explained in the following paragraphs.

The hazard of erosion refers to the potential for soil erosion following cutting operations and where the soil is exposed along roads, skid trails, fire lanes, and log-decking areas. Soil characteristics that affect this hazard are slope, stability of soil aggregates, infiltration, permeability, and coarse fragments. The rating is *slight* if the erosion hazard is negligible; it is *moderate* if the erosion hazard requires attention and practices for control; it is *severe* if the erosion hazard is great, requiring intensive management for control.

Equipment limitations are caused by soil characteristics and topographic features that restrict or prohibit the use of conventional equipment for planting and harvesting wood crops, for constructing roads, and for controlling fires. The rating is *slight* if there is no restriction on the kind of equipment used or on the time of year it can be used. It is *moderate* if there is a seasonal restriction of less than 3 months, or if some moderate restrictions are present because of slope, wetness, rockiness, or other physical characteristics. It is *severe* if there is a seasonal restriction on operating machinery for more than 3 months of the year, or if there are other extreme restrictions because of steep slopes or extreme wetness. This type of limitation commonly requires detailed scheduling of logging and sometimes specially adapted equipment.

Seedling mortality refers to the expected degree of mortality of natural seedlings or planting stock as influenced by the kind of soil, degree of erosion, and direction of slope. The rating is *slight* if ordinarily adequate natural regeneration takes place; it is *moderate* if natural regeneration cannot always be relied upon for adequate and immediate restocking; and it is *severe* if considerable replanting, special preparation of the seedbed, and use of superior planting techniques are required to assure satisfactory stands.

Plant competition refers to the invasion or growth of undesirable species on different kinds of soil when openings are made in canopy. The rating is *slight* if competition does not prevent adequate natural regeneration and early growth or interfere with planted seedlings; it is *moderate* if competition delays natural or artificial regeneration, but does not prevent eventual development of fully stocked stands; and it is *severe* if competition prevents adequate stands unless there is intensive site preparation and maintenance.

Windthrow hazard is an evaluation of soil characteristics that control development of tree roots and therefore affects resistance to wind. The rating is *slight* if no special hazards are recognized, and individual trees are expected to remain standing when released on all sides; it is *mod-*

Table 2.—*Predicted average yields per acre of major crops grown under improved management*

[Absence of yield figure means that crop is not suited to or is not commonly grown on the soil, or the soil is not arable]

Soil	Corn	Soybeans	Wheat	Mixed hay	Alfalfa hay
	Bu.	*Bu.*	*Bu.*	*Tons*	*Tons*
Alford silt loam, 2 to 6 percent slopes, eroded	115	35	45	3. 0	5. 0
Alford silt loam, 2 to 6 percent slopes, severely eroded	105	30	35	2. 5	4. 0
Alford silt loam, 6 to 12 percent slopes, eroded	95	32	40	3. 0	4. 0
Alford silt loam, 6 to 12 percent slopes, severely eroded	87	28	35	2. 5	3. 0
Alford silt loam, 12 to 18 percent slopes, eroded			40	2. 5	3. 5
Alford silt loam, 12 to 18 percent slopes, severely eroded				2. 0	3. 0
Alford silt loam, 18 to 25 percent slopes, eroded				2. 0	3. 0
Alford silt loam, 18 to 25 percent slopes, severely eroded					
Armiesburg silty clay loam	125	40	50	3. 0	4. 0
Ayrshire fine sandy loam	120	40	44	3. 0	4. 5
Bartle silt loam	105	30	40	3. 0	
Bloomfield loamy fine sand, 2 to 6 percent slopes	85	30	44	2. 5	5. 0
Bloomfield loamy fine sand, 6 to 12 percent slopes	75	27	38	2. 5	4. 5
Bloomfield loamy fine sand, 12 to 18 percent slopes			32	2. 5	3. 5
Bloomfield loamy fine sand, 18 to 35 percent slopes					
Bonnie silt loam	95	30	35	3. 0	
Cincinnati silt loam, 2 to 6 percent slopes, eroded	107	35	38	3. 0	
Cincinnati silt loam, 6 to 12 percent slopes, eroded	85	30	35	3. 0	
Cincinnati silt loam, 6 to 12 percent slopes, severely eroded	75	25	25	2. 5	
Cincinnati silt loam, 12 to 18 percent slopes, eroded	70		30	2. 5	
Cincinnati silt loam, 12 to 18 percent slopes, severely eroded				2. 5	
Cuba silt loam	110	40	45	3. 0	4. 0
Elston loam	95	30	52	3. 0	4. 0
Gilpin-Berks complex, 25 to 50 percent slopes					
Haymond silt loam	125	42	52	3. 0	4. 0
Hickory silt loam, 18 to 25 percent slopes, eroded					
Hickory silt loam, 25 to 50 percent slopes					
Hosmer silt loam, 0 to 2 percent slopes	110	38	43	3. 0	
Hosmer silt loam, 2 to 6 percent slopes, eroded	107	35	40	3. 0	
Hosmer silt loam, 2 to 6 percent slopes, severely eroded	85	30	27	2. 5	
Hosmer silt loam, 6 to 12 percent slopes, eroded	85	30	30	3. 0	
Hosmer silt loam, 6 to 12 percent slopes, severely eroded	75	25	25	2. 5	
Hosmer silt loam, 12 to 18 percent slopes, eroded	70		30	2. 5	
Hosmer silt loam, 12 to 18 percent slopes, severely eroded				2. 5	
Iona silt loam, 0 to 2 percent slopes	120	40	45	3. 0	5. 0
Iona silt loam, 2 to 6 percent slopes, eroded	115	40	45	3. 0	5. 0
Iva silt loam, 0 to 2 percent slopes	125	40	45	3. 0	4. 0
Iva silt loam, 2 to 4 percent slopes, eroded	120	40	42	3. 0	4. 0
Kings silty clay	90	30	35	3. 5	3. 8
Lyles fine sandy loam	120	40	44	3. 0	5. 0
Lyles loam	125	40	44	3. 0	5. 0
Markland silt loam, 2 to 6 percent slopes, eroded	90	32	33	3. 0	5. 0
Markland silt loam, 6 to 18 percent slopes, eroded	75		30	2. 5	3. 5
McGary silt loam	90	28	34	3. 0	3. 5
Montgomery silty clay loam	120	40	40	3. 0	3. 5
Negley loam, 25 to 50 percent slopes					
Nolin silty clay loam	125	42	50	3. 0	5. 0
Parke silt loam, 2 to 6 percent slopes, eroded	115	45	50	3. 0	4. 0
Parke silt loam, 6 to 12 percent slopes, eroded	110	43	45	3. 0	4. 0
Parke silt loam, 6 to 12 percent slopes, severely eroded	85	30	35	2. 5	3. 0
Parke silt loam, 12 to 18 percent slopes, eroded			40	2. 2	3. 5
Peoga silt loam	115	35	40	2. 5	2. 5
Petrolia silty clay loam	110	40	40	2. 5	2. 5
Princeton fine sandy loam, 0 to 2 percent slopes	115	38	47	3. 0	5. 0
Princeton fine sandy loam, 2 to 6 percent slopes, eroded	105	35	45	3. 0	5. 0
Princeton fine sandy loam, 6 to 12 percent slopes, eroded	100	30	40	2. 5	4. 5
Princeton fine sandy loam, 12 to 18 percent slopes, eroded			30	2. 5	4. 0
Ragsdale silt loam	130	40	45	3. 0	5. 0
Reesville silt loam	125	40	45	3. 0	4. 0
Ross loam	125	40	45	3. 0	4. 0
Stendal silt loam	110	35	35	2. 5	2. 5
Strip mines					
Vigo silt loam	105	30	35	3. 0	
Vincennes clay loam	120	40	44	3. 0	5. 0
Wakeland silt loam	110	35	40	2. 5	2. 5
Wellston silt loam, 12 to 18 percent slopes, eroded			35	2. 5	3. 0
Wellston silt loam, 12 to 18 percent slopes, severely eroded				2. 0	3. 0

TABLE 2.—*Predicted average yields per acre of major crops grown under improved management*—Continued

Soil	Corn	Soybeans	Wheat	Mixed hay	Alfalfa hay
	Bu.	*Bu.*	*Bu.*	*Tons*	*Tons*
Wellston silt loam, 18 to 25 percent slopes					
Wellston silt loam, 25 to 35 percent slopes					
Zanesville silt loam, 2 to 6 percent slopes, eroded	105	32	38	3.0	
Zanesville silt loam, 6 to 12 percent slopes, eroded	85	30	40	3.0	
Zanesville silt loam, 6 to 12 percent slopes, severely eroded	75	25	25	2.5	
Zanesville silt loam, 12 to 18 percent slopes, eroded			25	2.5	
Zanesville silt loam, 12 to 18 percent slopes, severely eroded				2.5	
Zipp silty clay loam	85	30	35	3.5	
Zipp silty clay loam, overwash	110	35	40	3.5	

TABLE 3.—*Interpretations for woodland use of the soils*

Woodland suitability group and map symbols	Potential productivity			Common trees			Trees suitable for planting
	Tree	Site index	Estimated yearly growth	Most desirable	Acceptable	Least desirable	
			Bd. ft./acre Doyle rule				
Group 1o1: AlB2, AlB3, AlC2, AlC3, AlD2, AlD3, IoA, IoB2, PaB2, PaC2, PaC3, PaD2.	Upland oaks Tulip-poplar White pine	85–95 90–105 85–95	300–375 335–450 300–375	Red oak, white oak, white ash, tulip-poplar, black walnut, sugar maple.	Black oak, sweetgum, red elm, beech, sassafras.	Hickory, blackgum, white elm, red maple.	White ash, black locust, white pine, red pine, tulip-poplar, black walnut.
Group 1o8: Cu, Hd, No.	Tulip-poplar. White pine	95–105 80–90	375–450 260–335	Cottonwood, sycamore, tulip-poplar, black walnut, white ash.	Hackberry, red maple, bur oak, swamp chestnut oak, sweetgum.	Boxelder, willow, silver maple, white elm, hickory.	White pine, black walnut, tulip-poplar, black locust.
Group 1r2: AlE2, AlE3, HkE2, HkF, NeF, PrA, PrB2, PrC2, PrD2.	Upland oaks Tulip-poplar	85–95 95–105	300–375 375–450	Red oak, white oak, white ash, tulip-poplar, black walnut, sugar maple.	Black oak, sweetgum, red elm, beech, sassafras.	Hickory, blackgum, white elm, red maple.	White pine, red pine, black locust, black walnut, tulip-poplar.
Group 2s15: BlB, BlC, BlD, BlF	Upland oaks Tulip-poplar White pine Red pine	75–85 75–85 80–90 70–80	220–300 220–300 260–335 185–260	Black oak, tulip-poplar, red oak, white oak, black walnut.	White ash, post oak, scarlet oak, shingle oak.	Blackgum, hickory, sugar maple, sassafras.	White pine, red pine, tulip-poplar, European black alder, black walnut.
Group 2w11: Bo, Kn, Ls, Ly, Mo, Pe, Ra, Vn, Zp, Zs.	Pin oak Upland oaks Sweetgum White pine	80–90 70–80 85–95 [1] 80–90	260–335 185–260 300–375 260–335	Pin oak, red maple, bur oak, white ash, sweetgum.	Sycamore, white oak, tulip-poplar, swamp white oak, shingle oak, river birch.	White elm, boxelder, beech, hickory, blackgum.	White pine, baldcypress, red maple, white ash, sweetgum.

See footnotes at end of table.

TABLE 3—*Interpretations for woodland use of the soils*—Continued

Woodland suitability group and map symbols	Potential productivity: Tree	Site index	Estimated yearly growth	Common trees: Most desirable	Acceptable	Least desirable	Trees suitable for planting
			Bd. ft./acre Doyle rule				
Group 2w13: Po, Sr, Wa.	Pin oak Sweetgum Tulip-poplar Virginia pine White pine	85–95 80–90 85–95 85–95 [1] 80–90	300–375 260–335 300–375 300–375 260–335	Sweetgum, red maple, swamp chestnut oak, pin oak, tulip-poplar.	Sycamore, white oak, swamp white oak, cottonwood.	White elm, hickory, beech, blackgum.	White pine, baldcypress, sycamore, red maple, white ash.
Group 3d9: CcB2, CcC2, CcC3, CcD2, CcD3, HoA, HoB2, HoB3, HoC2, HoC3, HoD2, HoD3, ZaB2, ZaC2, ZaC3, ZaD2, ZaD3.	Upland oaks Tulip-poplar Virginia pine White pine	70–80 85–95 70–80 80–90	185–260 300–375 185–260 260–335	White oak, white ash, tulip-poplar, chestnut oak.	Scarlet oak, black oak, sugar maple, sweetgum.	Hickory, blackgum, white elm, beech.	White pine, shortleaf pine, red pine, Virginia pine, tulip-poplar, white ash.
Group 3o10: GbF, WeD2, WeD3, WeE, WeF	Upland oaks Tulip-poplar Shortleaf pine White pine	70–80 90–100 70–80 70–80	185–260 335–415 185–260 185–260	White oak, black oak, red oak, tulip-poplar, white ash.	Chinquapin oak, beech, sugar maple, red elm.	White elm, hickory, buckeye, honeylocust.	White pine, red pine, shortleaf pine, tulip-poplar, white ash.
Group 3r18: MaB2, MaD2.	Upland oaks Tulip-poplar White pine	70–80 85–95 [1] 70–80	185–260 300–375 185–260	White oak, black oak, bur oak, tulip-poplar, swamp chestnut oak.	Basswood, red oak, sugar maple, shingle oak, sweetgum, white ash.	Hickory, white elm, red maple, pin oak, swamp white oak.	White pine, red pine, tulip-poplar, white ash.
Group 3w5: Ay, Ba, IvA, IvB2, Mg, Re, Vg.	Upland oaks Pin oak Tulip-poplar Sweetgum	70–80 80–90 80–90 75–85	185–260 260–335 260–335 220–300	White ash, red maple, bur oak, pin oak, tulip-poplar, sweetgum.	Sycamore, white oak, shingle oak, river birch, swamp white oak.	White elm, beech, hickory, blackgum, boxelder.	White pine, baldcypress, white ash, red maple, tulip-poplar, sycamore.
Group 4r16: St.	Shortleaf pine Virginia pine	[2] 53–72 [2] 45–53	[2] 100–200 [2] 75–100	Cottonwood, sycamore, red maple, green ash.	Sassafras, red oak, redcedar, white ash, black cherry, river birch.	White elm, aspen, black willow, boxelder, honeylocust.	Sweetgum [3], tulip-poplar [4], black walnut [4], sycamore [3], European black-alder [3], cottonwood, white pine [3], shortleaf pine [4], river birch [5], jack pine [5], Virginia pine [5], pitch pine [5].
Group o23; Ar, En, Ro. No interpretations. These soils are not suited to commercial wood crops.							

[1] Estimated.

[2] In waste areas around clay and gravel pits the estimated site index for shortleaf pine is 72–85 and for Virginia pine is 53–72. In these areas, the estimated yearly growth for shortleaf pine is 200–300 feet and 100–200 feet for Virginia pine.

[3] Suitable where soil reaction is pH 4.0–7.0.

[4] Suitable where soil reaction is pH 5.5–7.0.

[5] Suitable where soil reaction is pH 4.0–5.5.

erate if root development is adequate for stability except during periods of excessive wetness or great wind velocity; and it is *severe* if depth of tree rooting does not give adequate stability and individual trees are likely to be blown over if released on all sides. It is extremely important that landowners understand this hazard if they plan to thin a stand of trees where an area is to be used as homesites, or for a park and recreation.

Each woodland suitability group in Daviess County is identified by a symbol, for example, 3d9. The first part of the symbol is a number that indicates the productive potential of soils in the group. Class 1 is highest for the particular woodland crop, followed by classes 2 and 3. The second part of the symbol is a letter that indicates a subclass based on selected soil characteristics that cause important hazards or limitations in woodland use or management: *w* for excessive wetness in the soils either seasonally or year-long; *d* for restricted rooting depth; *s* for sandy soils that contain a large amount of coarse-textured material; *r* for strong relief or steep slopes; and *o* for slight or no limitations on woodland use or management.

The third part of the symbol is a number that indicates the placement of the group in a statewide system. All of the numbers in the State system are not recognized in Daviess County; therefore, the group numbers are not consecutive in this soil survey.

For each woodland suitability group in the county, the hazards and limitations affecting use of the soils for wood crops are discussed in the following paragraphs.

WOODLAND SUITABILITY GROUP 1o1

On the soils in this group, the hazard of erosion is slight, and there are no equipment limitations. Seedling mortality is slight and not expected to exceed 25 percent. Plant competition is moderate because of the high natural fertility, but young trees eventually grow to a fully stocked stand. Growth of roots is not restricted, and the windthrow hazard is only slight.

WOODLAND SUITABILITY GROUP 1o8

On the soils in this group, the hazard of erosion, equipment limitations, seedling mortality, and windthrow hazard are slight. Plant competition is moderate because of the high natural soil fertility and a good moisture supply, which provide ideal conditions for the growth of rank weeds. These soils are subject to occasional flooding. This is commonly beneficial to the establishment of seedlings, especially those of cottonwood, sycamore, and red maple. Most stands of trees are in relatively narrow strips along major streams.

WOODLAND SUITABILITY GROUP 1r2

On the soils in this group, the hazard of erosion is moderate where slopes are 18 to 35 percent. Equipment limitations are moderate to severe because it is impractical to use regular farm equipment for logging on soils having slopes of 18 to 35 percent. Seedling mortality is mainly slight, except where slopes are very steep and face south. Plant competition is moderate, and the hazard of windthrow is slight.

WOODLAND SUITABILITY GROUP 2s15

On the soils in this group, the hazard of erosion is moderate where slopes are steep. Equipment limitations are moderate, and seedling mortality is slight. Natural regeneration is dependable and normally produces good stands. The hazards of plant competition and windthrow are slight.

WOODLAND SUITABILITY GROUP 2w11

On the soils in this group, the hazard of erosion is slight, and equipment limitations are severe. Late in winter and early in spring, logging is impractical because of extreme wetness and generally results in damage to tree roots and soil structure. Seedling mortality is severe because of excessive flooding and ponding. The hazards of plant competition and windthrow are severe. Natural regeneration generally is more successful than planting.

WOODLAND SUITABILITY GROUP 2w13

On the soils in this group, the hazard of erosion is slight, and equipment limitations are moderate. Logging is very difficult late in winter and early in spring because of ponded water or an exceptionally high water table. Operations during this period can damage roots and soil structure. Seedling mortality is slight, and the hazards of plant competition and windthrow are moderate.

WOODLAND SUITABILITY GROUP 3d9

The soils in this group have a very slowly permeable fragipan in the subsoil. The fragipan restricts the downward movement of water and roots and limits the available moisture capacity. The hazard of erosion is moderate, and equipment limitations are slight. Seedling mortality is slight. Plant competition is slight because of low natural fertility. The hazard of windthrow is moderate because of shallow rooting caused by the restrictive layer in the subsoil.

WOODLAND SUITABILITY GROUP 3o10

On the soils in this group, the hazard of erosion is generally slight or moderate, but it is severe on steep soils during and following logging. Equipment limitations are moderate where slopes are more than 12 percent. Because seedling mortality is slight and plant competition is only moderate, reproduction of well-stocked stands is satisfactory. The hazard of windthrow is slight.

WOODLAND SUITABILITY GROUP 3r18

On the soils in this group, the hazard of erosion and the equipment limitations are moderate where slopes are steep. Seedling mortality and the hazard of windthrow are slight. Plant competition is moderate.

WOODLAND SUITABILITY GROUP 3w5

On the soils in this group, the hazard of erosion is slight. Equipment limitations are moderate, and logging is impractical late in winter or early in spring because of extreme wetness. Logging during this period can result in damage to tree roots and soil structure. Seedling mortality is mainly slight, but some mortality is likely in exceptionally wet years. Plant competition is moderate, and the hazard of windthrow is slight.

WOODLAND SUITABILITY GROUP 4r16

The soils in this group are not suitable for tree production. The hazard of erosion is moderate where slopes are steep and broken. During the first few years after the areas

in Strip mines and pits are abandoned, erosion tends to level the steep ridges. Equipment limitations are severe because of the rough, broken topography, and special logging equipment is needed to harvest wood crops. In many places it is necessary to construct access roads prior to logging. Seedling mortality is slight. The rough topography tends to catch wind-distributed tree seeds and retain them until germination takes place. Plant competition is slight. Tree roots can develop rather deep because the soil material is loose, and windthrow is not a hazard.

WOODLAND SUITABILITY GROUP o23

This group consists of soils that support a natural cover of mixed grasses. These soils are not well suited to commercial woodcrop production. Satisfactory stands of trees for measuring site index are not available, and therefore, this group is not rated for woodcrop production.

Wildlife

The soils, topography, climate, wide variety of native and other suited kinds of vegetation, and other features combine to favor development of wildlife habitat in Daviess County. These features provide a high potential for managing the soils to increase and maintain various kinds of wildlife habitat.

Three major kinds of wildlife are recognized in Daviess County. These are open-land wildlife, woodland wildlife, and wetland wildlife. There is a high potential for developing habitat for open-land wildlife and woodland wildlife throughout most of the county. Only small localized areas have a suitable potential for kinds of wildlife that prefer a wetland habitat. The three major kinds of wildlife are defined as follows:

Open-land wildlife.—Birds, mammals, and reptiles that normally frequent cropland, pasture, and hayland overgrown with grasses, herbs, and shrubs. Examples of openland wildlife are rabbit, red fox, skunk, quail, and meadowlark. Considered in rating soils for this kind of wildlife is the suitability for seed and grain crops, grasses and legumes, wild herbaceous upland plants, and hardwood woodland plants.

Woodland wildlife.—Mammals and birds that frequent areas of hardwood and coniferous trees, shrubs, or a combination of these. Examples of woodland wildlife are squirrel, deer, raccoon, woodpecker, and nuthatch. Considered in rating soils for this kind of wildlife is their suitability for grasses and legumes, wild herbaceous upland plants, hardwood woodland plants, and coniferous woodland plants.

Wetland wildlife.—Mammals, birds, and reptiles that frequent wet areas such as ponds, marshes, and swamps. Examples of wetland wildlife are muskrat, wild duck and geese, kingfisher, and redwing blackbird. Considered in rating soils for this kind of wildlife is the suitability for wetland food and cover plants, for seed and grain crops, and for shallow water developments and excavated ponds.

In table 4 the soils in Daviess County are rated according to their suitability for providing habitat for each of the three kinds of wildlife. For a rating other than well suited, the kind of limitation of the soil that influences habitat elements used by the three kinds of wildlife is also given.

A rating of well suited means habitats are generally easily created, improved, or maintained. There are few or no limitations that affect management. A rating of suited means habitats generally can be created, improved, or maintained, but there are moderate soil limitations that affect management. A rating of poorly suited means habitats generally can be created, improved, or maintained, but there are rather severe soil limitations. A rating of unsuited means it is very questionable that habitats can be created, improved, or maintained and is generally impractical under prevailing conditions.

Because of the variability of materials, acidity of spoil, and water in open pits, Strip mines are not given a rating. Areas that have been sufficiently leached to support vegetation, however, are suited to wildlife habitat development. Onsite inspection is needed to determine the suitability rating of each area of Strip mines.

Recreation

Outdoor recreation is already a major part of American life and can be expected to increase greatly by the year 2000. For this reason, it should be an integral element in local land use planning.

The location of Daviess County in relationship to centers of population, as well as the landscape and resources of the county, all make it possible to develop some income-producing enterprises. The most likely enterprises are hunting areas, shooting preserves, improved picnic areas, fishing waters, and areas for water sports.

Several recreation facilities have been established and are in use today. These include Montgomery City Park and Glendale State Fish and Game Area. West Boggs Recreation Area is presently being developed.

Watershed development in upland areas offers potential for multipurpose impoundments of different-size bodies of water. Some well-drained soils in upland areas are well suited to picnic grounds, intensive play areas, and tent and camp trailer sites.

In table 5 (p. 57) the soils in Daviess County are rated according to their limitations for developing five kinds of recreation facilities. These are tent and camp trailer sites; picnic areas, parks, and extensive play areas; playgrounds, athletic fields, and intensive play areas; trails and paths; and golf fairways. Information about the suitability of soils for foundations and septic tank filter fields for home dwellings and utility buildings is given in the section "Use of the Soils in Engineering."

The ratings used in table 5 are slight, moderate, and severe. For a rating other than slight, the table also lists the kind of limitations of the soil that influence development of a specific recreation facility.

A rating of *slight* means the facility is easily created, improved, or maintained. There are few or no limitations that affect design or management. A rating of *moderate* means the facility generally can be created, improved, or maintained, but there are moderate soil limitations that affect design management. A rating of *severe* means that the practicability of establishing the facility is questionable. Extreme measures are needed to overcome the limitation, and usage is generally unsound or not practical.

TABLE 4.—*Suitability of the soils for kinds of wildlife*

An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to other series that appear in the first column of this table]

Soil series and map symbols	Open-land wildlife	Woodland wildlife	Wetland wildlife
Alford: AlB2, AlB3, AlC2, AlC3, AlD2, AlD3, AlE2, AlE3.	Well suited: slopes of 2 to 12 percent. Suited: slopes of 12 to 25 percent; erosion hazard; poor or very poor for grain and seed crops; fair for grasses and legumes.	Well suited	Unsuited: well drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds.
Armiesburg: Ar	Well suited	Well suited	Unsuited: well drained; subject to occasional flooding; very poor for wetland food and cover plants and for shallow water developments and ponds; fair for grain and seed crops.
Ayrshire: Ay	Well suited	Suited: somewhat poorly drained; fair for grain and seed crops and for grasses and legumes; good for hardwood woody plants; poor for coniferous woody plants because of rapid growth rate.	Suited: somewhat poorly drained; fair for wetland food and cover plants, for shallow water developments and excavated ponds, and for grain and seed crops.
Bartle: Ba	Well suited	Suited: somewhat poorly drained; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Suited: somewhat poorly drained; fair for wetland food and cover plants and for shallow water developments and excavated ponds.
Berks. Mapped only with Gilpin soils.	Poorly suited: erosion hazard; very poor for seed and grain crops; fair for grasses and legumes.	Suited: erosion hazard; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Unsuited: well drained; very poor for wetland food and cover plants, for shallow water developments and excavated ponds, and for seed and grain crops.
Bloomfield: BlB, BlC, BlD, BlF.	Suited: somewhat excessively drained; poor for grain and seed crops; fair for grasses and legumes, for wild herbaceous upland plants, and for hardwood woody plants.	Suited: somewhat excessively drained; fair for grasses and legumes, for wild herbaceous upland plants, and for hardwood woody plants.	Unsuited: somewhat excessively drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds; poor for grain and seed crops.
Bonnie: Bo	Suited: poorly drained; poor for grain and seed crops; fair for grasses and legumes and for wild herbaceous upland plants.	Well suited	Suited: poorly drained; fair for wetland food and cover plants and shallow water developments; very poor for excavated ponds; poor for grains and seed crops.
Cincinnati: CcB2, CcC2, CcC3, CcD2, CcD3.	Well suited: slopes of 2 to 12 percent. Suited: 12 to 18 percent slopes; erosion hazard; poor for grain and seed crops; fair for grasses and legumes.	Well suited	Unsuited: well drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds; good to fair for grain and seed crops.
Cuba: Cu	Well suited	Well suited	Unsuited: well drained; poor for wetland food and cover plants and for shallow water developments and excavated ponds.
Elston: En	Well suited	Well suited	Unsuited: well drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds.
*Gilpin: GbF. For Berks part of this unit, see Berks series.	Suited: erosion hazard; very poor for seed and grain crops; fair for grasses and legumes.	Suited: erosion hazard; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Unsuited: well drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds.

TABLE 4.—*Suitability of the soils for kinds of wildlife*—Continued

Soil series and map symbols	Open-land wildlife	Woodland wildlife	Wetland wildlife
Haymond: Hd	Well suited	Well suited	Unsuited: Well drained; poor for wetland food and cover plants and for shallow water developments and excavated ponds.
Hickory: HkE2, HkF	Suited: slopes of 18 to 35 percent; erosion hazard; very poor for grain and seed crops; moderate for grasses and legumes. Poorly suited: slopes of 35 to 50 percent; erosion hazard; very poor for grain and seed crops; poor for grasses and legumes.	Suited: erosion hazard; fair to poor for grasses and legumes; good for wild herbaceous upland plants; poor for coniferous woody plants because of rapid growth rate.	Unsuited: Well drained; steep slopes; very poor for wetland food and cover plants, for shallow water developments and excavated ponds, and for grain and seed crops.
Hosmer: HoA, HoB2, HoB3, HoC2, HoC3, HoD2, HoD3.	Well suited: slopes of 0 to 12 percent. Suited: slopes of 12 to 18 percent; erosion hazard; poor or very poor for grain and seed crops; fair for grasses and legumes.	Well suited	Unsuited: well drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds; good to fair for grain and seed crops.
Iona: IoA, IoB2	Well suited	Well suited	Unsuited: moderately well drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds.
Iva: IvA, IvB2	Well suited	Suited: somewhat poorly drained; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Suited: somewhat poorly drained; fair for wetland food and cover plants, for shallow water developments and excavated ponds, and for seed and grain crops.
Kings: Kn	Poorly suited: very poorly drained; clayey materials to a depth of 30 inches; very poor for grain and seed crops; poor for grasses and legumes.	Well suited	Well suited.
Lyles: Ls, Ly	Poorly suited: very poorly drained; very poor for grain and seed crops; poor for grasses and legumes.	Well suited	Well suited.
Markland: MaB2, MaD2.	Well suited	Well suited	Unsuited: well drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds.
McGary: Mg	Well suited	Suited: somewhat poorly drained; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Suited: somewhat poorly drained; fair for wetland food and cover plants, for shallow water developments and excavated ponds, and for seed and grain crops.
Montgomery: Mo	Poorly suited: very poorly drained; clayey materials to a depth of 30 inches; very poor for grain and seed crops; poor for grasses and legumes.	Well suited	Well suited.
Negley: NeF	Poorly suited: slopes of 25 to 50 percent; erosion hazard; very poor for grain and seed crops; poor for grasses and legumes.	Suited: erosion hazard; fair to poor for grasses and legumes; good for wild herbaceous upland plants and for hardwood woody plants; poor for coniferous woody plants because of rapid growth rate.	Unsuited; well drained; steep slopes; very poor for wetland food and cover plants, for shallow water developments and excavated ponds, and for grain and seed crops.

TABLE 4.—*Suitability of the soils for kinds of wildlife*—Continued

Soil series and map symbols	Open-land wildlife	Woodland wildlife	Wetland wildlife
Nolin: No	Well suited	Well suited	Unsuited: well drained; poor for wetland food and cover plants and for shallow water developments and excavated ponds.
Parke: PaB2, PaC2, PaC3, PaD2.	Well suited: slopes of 2 to 12 percent. Suited: slopes of 12 to 18 percent; erosion hazard; poor or very poor for grain and seed crops; fair for grasses and legumes.	Well suited	Unsuited: well drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds.
Peoga: Pe	Suited: poorly drained; poor for seed and grain crops; fair for grasses and legumes and for wild herbaceous upland plants.	Well suited	Well suited.
Petrolia: Po	Well suited	Suited: poorly drained; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Suited: poorly drained; fair for wetland food and cover plants, for shallow water developments and excavated ponds, and for seed and grain crops.
Princeton: PrA, PrB2, PrC2, PrD2.	Well suited	Well suited	Unsuited: well drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds.
Ragsdale: Ra	Poorly suited: very poorly drained; very poor for grain and seed crops; poor for grasses and legumes.	Well suited	Well suited.
Reesville: Re	Well suited	Suited: somewhat poorly drained; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Suited: somewhat poorly drained; fair for wetland food and cover plants, for shallow water developments and excavated ponds, and for seed and grain crops.
Ross: Ro	Well suited	Well suited	Unsuited: well drained; poor for wetland food and cover plants and for shallow water developments and excavated ponds.
Stendal: Sr	Well suited	Suited: somewhat poorly drained; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Suited: somewhat poorly drained; fair for wetland food and cover plants, for shallow water developments and excavated ponds, and for seed and grain crops.
Strip mines: St. Properties are too variable to rate.			
Vigo: Vg	Well suited	Suited: somewhat poorly drained; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Suited: somewhat poorly drained; fair for wetland food and cover plants and for shallow water developments and excavated ponds.
Vincennes: Vn	Poorly suited: very poorly drained; very poor for grain and seed crops; poor for grasses and legumes.	Well suited	Well suited.

TABLE 4.—*Suitability of the soils for kinds of wildlife*—Continued

Soil series and map symbols	Open-land wildlife	Woodland wildlife	Wetland wildlife
Wakeland: Wa	Well suited	Suited: somewhat poorly drained; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Suited: somewhat poorly drained; fair for wetland food and cover plants, for shallow water developments and excavated ponds, and for seed and grain crops.
Wellston: WeD2, WeD3, WeE, WeF.	Suited: slopes of 12 to 25 percent; erosion hazard; poor or very poor for seed and grain crops; fair for grasses and legumes. Poorly suited: slopes of 25 to 35 percent; erosion hazard; very poor for seed and grain crops; poor for grasses and legumes.	Suited: erosion hazard; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Unsuited: well drained; very poor for wetland food and cover plants and for shallow water developments and excavated ponds.
Zanesville: ZaB2, ZaC2, ZaC3, ZaD2, ZaD3.	Well suited: slopes of 2 to 12 percent. Suited: 12 to 18 percent; erosion hazard; poor for seed and grain crops; fair for grasses and legumes.	Well suited: slopes of 2 to 12 percent. Suited: slopes of 12 to 18 percent; erosion hazard; fair for grasses and legumes; poor for conifers because of rapid growth rate and canopy closure.	Unsuited: well drained; very poor for wetland food and cover crops and for shallow water developments and excavated ponds.
Zipp: Zp, Zs	Poorly suited: very poorly drained; clayey materials to a depth of 30 inches; very poor for grain and seed crops; poor for grasses and legumes.	Well suited	Well suited.

TABLE 5.—*Degree and kind of limitations for recreation*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to other series that appear in the first column of this table]

Soil series and map symbols	Tent and camp trailer sites	Picnic areas, parks, and extensive play areas	Playgrounds, athletic fields, and intensive play areas	Trails and paths	Golf fairways
Alford: AlB2, AlB3, AlC2, AlC3, AlD2, AlD3, AlE2, AlE3.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 25 percent. Wet and soft after a rain.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 25 percent. Wet and soft after a rain.	Moderate if slope is 2 to 6 percent and severe if 6 to 25 percent.	Slight if slope is 2 to 12 percent and moderate if 12 to 25 percent.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 25 percent.
Armiesburg: Ar [1]	Moderate: wet and sticky after a rain.	Moderate: wet and sticky after a rain.	Severe: subject to flooding.	Moderate: wet, sticky, and soft after a rain.	Moderate: wet and sticky after a rain; subject to occasional flooding.
Ayrshire: Ay	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Bartle: Ba	Severe: somewhat poorly drained; very slow permeability; wet and soft after a rain.	Moderate: somewhat poorly drained; wet and soft after a rain.	Severe: somewhat poorly drained; very slow permeability.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Berks. Mapped only with Gilpin soils.	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent; 20 to 48 inches to bedrock.	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent.

See footnote at end of table.

TABLE 5.—*Degree and kind of limitations for recreation*—Continued

Soil series and map symbols	Tent and camp trailer sites	Picnic areas, parks, and extensive play areas	Playgrounds, athletic fields, and intensive play areas	Trails and paths	Golf fairways
Bloomfield: BlB, BlC, BlD, BlF.	Moderate if slope is 2 to 12 percent and severe if 12 to 35 percent. Loose sand subject to blowing.	Moderate if slope is 2 to 12 percent and severe if 12 to 35 percent. Loose sand subject to blowing; poor footing when dry.	Moderate if slope is 2 to 6 percent and severe if 6 to 35 percent. Loose sand subject to blowing; poor footing when dry.	Moderate if slope is 2 to 25 percent and severe if 25 to 35 percent. Loose sand subject to blowing; poor footing when dry.	Moderate if slope is 2 to 12 percent and severe if 12 to 35 percent. Loose sand subject to blowing; poor footing when dry.
Bonnie: Bo [1]	Severe: poorly drained; subject to flooding.	Severe: poorly drained; subject to flooding.	Severe: poorly drained; subject to flooding.	Severe: poorly drained; subject to flooding.	Severe: poorly drained; subject to flooding.
Cincinnati: CcB2, CcC2, CcC3, CcD2, CcD3.	Severe: very slow permeability.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.	Severe: very slow permeability.	Slight if slope is 2 to 12 percent and moderate if 12 to 18 percent.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.
Cuba: Cu [1]	Severe: subject to flooding.	Moderate: wet and soft after a rain.	Severe: wet and soft after a rain.	Moderate: wet and soft after a rain.	Moderate: wet and soft after a rain.
Elston: En	Slight	Slight	Slight	Slight	Slight.
*Gilpin: GbF. For Berks part of this unit, see Berks series.	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent.
Haymond: Hd [1]	Severe: subject to flooding.	Moderate: wet and soft after a rain.	Severe: wet and soft after a rain.	Moderate: wet and soft after a rain.	Moderate: wet and soft after a rain.
Hickory: HkE2, HkF.	Severe: slopes of 18 to 50 percent.	Severe: slopes of 18 to 50 percent.	Severe: slopes of 18 to 50 percent.	Moderate if slope is 18 to 25 percent and severe if 25 to 50 percent.	Severe: slopes of 18 to 50 percent.
Hosmer: HoA, HoB2, HoB3, HoC2, HoC3, HoD2, HoD3.	Severe: very slow permeability.	Slight if slope is 0 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.	Severe: very slow permeability.	Slight if slope is 0 to 12 percent and moderate if 12 to 18 percent.	Slight if slope is 0 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.
Iona: IoA, IoB2	Moderate: moderately slow permeability; slow to dry after a rain.	Slight	Moderate: moderately slow permeability; slow to dry after a rain.	Slight	Slight.
Iva: IvA, IvB2	Moderate: somewhat poorly drained; slow to dry after a rain.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; slow to dry after a rain.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Kings: Kn	Severe: very poorly drained; very slowly permeable; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.
Lyles: Ls, Ly	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.

See footnote at end of table.

TABLE 5.—*Degree and kind of limitations for recreation*—Continued

Soil series and map symbols	Tent and camp trailer sites	Picnic areas, parks, and extensive play areas	Playgrounds, athletic fields, and intensive play areas	Trails and paths	Golf fairways
Markland: MaB2, MaD2.	Moderate: slopes of 6 to 18 percent; slow permeability; slow to dry after a rain.	Moderate: slopes of 6 to 18 percent.	Severe: slopes of 6 to 18 percent.	Slight	Moderate to severe: slopes of 6 to 18 percent.
McGary: Mg	Moderate: somewhat poorly drained; slow permeability; wet and soft after a rain.	Moderate: somewhat poorly drained; wet and soft after a rain.	Moderate: somewhat poorly drained; slow permeability; slow to dry after a rain.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Montgomery: Mo	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.
Negley: NeF	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent.	Severe: slopes of 25 to 50 percent.
Nolin: No [1]	Severe: subject to flooding.	Moderate: wet and soft after a rain.	Severe: wet and soft after a rain.	Moderate: wet and soft after a rain.	Moderate: wet and soft after a rain.
Parke: PaB2, PaC2, PaC3, PaD2.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.	Moderate if slope is 2 to 6 percent, and severe if 6 to 18 percent.	Slight if slope is 2 to 12 percent, and moderate if 12 to 18 percent.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.
Peoga: Pe	Severe: poorly drained; high water table; subject to ponding.	Severe: poorly drained; high water table; subject to ponding.	Severe: poorly drained; high water table; subject to ponding.	Severe: poorly drained; high water table; subject to ponding.	Severe: poorly drained; high water table; subject to ponding.
Petrolia: Po [1]	Severe: subject to flooding; high water table; subject to ponding.	Severe: subject to flooding; high water table; subject to ponding.	Severe: subject to flooding; high water table; subject to ponding.	Severe: subject to flooding; high water table; subject to ponding.	Severe: subject to flooding; high water table; subject to ponding.
Princeton: PrA, PrB2, PrC2, PrD2.	Slight if slope is 0 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.	Slight if slope is 0 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.	Slight if slope is 0 to 2 percent, moderate if 2 to 6 percent, and severe if 6 to 18 percent.	Slight if slope is 0 to 12 percent, and moderate if 12 to 18 percent.	Slight if slope is 0 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.
Ragsdale: Ra	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; subject to ponding.
Reesville: Re	Moderate: somewhat poorly drained; slow to dry after a rain.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; slow to dry after a rain.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Ross: Ro [1]	Severe: subject to flooding.	Moderate: wet and soft after a rain.	Severe: wet and soft after a rain.	Moderate: wet and soft after a rain.	Moderate: wet and soft after a rain.
Stendal: Sr [1]	Severe: somewhat poorly drained; subject to flooding.	Severe: somewhat poorly drained; subject to flooding.	Severe: somewhat poorly drained; subject to flooding.	Moderate: somewhat poorly drained; subject to flooding.	Severe: subject to flooding.

See footnote at end of table.

TABLE 5.—*Degree and kind of limitations for recreation*—Continued

Soil series and map symbols	Tent and camp trailer sites	Picnic areas, parks, and extensive play areas	Playgrounds, athletic fields, and intensive play areas	Trails and paths	Golf fairways
Strip mines: St. Onsite investigation needed.					
Vigo: Vg	Severe: somewhat poorly drained; very slow permeability; wet and soft after a rain.	Moderate: somewhat poorly drained; soft after a rain.	Severe: somewhat poorly drained; very slow permeability.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; very slow permeability.
Vincennes: Vn	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.	Severe: very poorly drained; high water table; subject to ponding.
Wakeland: Wa[1]	Severe: somewhat poorly drained; subject to flooding.	Severe: somewhat poorly drained; subject to flooding.	Severe: somewhat poorly drained; subject to flooding.	Moderate: somewhat poorly drained; subject to flooding.	Severe: subject to flooding.
Wellston: WeD2, WeD3, WeE, WeF.	Severe: slopes of 18 to 35 percent.	Severe: slopes of 18 to 35 percent.	Severe: slopes of 18 to 35 percent.	Moderate if slope is 18 to 25 percent, and severe if 25 to 35 percent.	Severe: slopes of 18 to 35 percent.
Zanesville: ZaB2, ZaC2, ZaC3, ZaD2, ZaD3.	Severe: very slow permeability.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.	Severe: very slow permeability.	Slight if slope is 2 to 12 percent, and moderate if 12 to 18 percent.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if 12 to 18 percent.
Zipp: Zp, Zs	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.	Severe: very poorly drained; very slow permeability; soft and sticky when wet; subject to ponding; high water table.

[1] Frequency and intensity of flooding are extremely variable. Onsite inspection required.

Areas of Strip mines that have been sufficiently leached to support vegetation and wildlife are suitable for recreation to a varying degree. Onsite investigation is needed to determine the degree of limitation for recreational development.

Use of the Soils in Engineering [3]

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, facilities for water storage, erosion control structures, drainage systems, and sewage disposal systems. Among the properties most important to engineers are permeability, strength, consolidation characteristics, texture, plasticity, and soil reaction. Depth to unconsolidated materials and topography are also important.

Information concerning these and related soil properties is given in tables 6 and 7. The estimates and interpretations in these tables can be used to—

1. Make studies that aid in selecting and developing industrial, commercial, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils in planning drainage systems, farm ponds, irrigation systems, terraces, waterways, and diversion terraces.
3. Make preliminary evaluations of soil conditions that aid in selecting sites for highways, airports, pipelines, and cables and in planning detailed investigations at selected locations.
4. Locate probable sources of gravel, sand, and other construction material.
5. Correlate performance of soil mapping units to develop information that is useful in planning engineering practices and in designing and maintaining engineering structures.
6. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement other publications, such as maps, reports, and aerial photographs, that are used in preparation of engineering reports for a specific area.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

The engineering interpretations reported here do not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads or excavations deeper than the depths reported (ordinarily about 5 feet). Even in these situations, however, the soil map is useful in planning more detailed field investigations and in indicating the kinds of problems that can be expected.

Some of the terms used by soil scientists have special meanings in soil science that may not be familiar to engineers. These terms are defined in the Glossary.

Engineering classification

The two systems most commonly used in classifying soils for engineering are the systems approved by the American Association of State Highway Officials (AASHO) and the Unified system.

[3] Prepared by HAROLD W. BELCHER, engineer, Soil Conservation Service.

The AASHO system (*1*) is used to classify soils according to those properties that affect use in highway construction. In this system all soil material is classified in seven principal groups. The groups range from A-1, soils that have the highest bearing strength and are the best soils for subgrade, to A-7, soils that have the lowest strength when wet.

In the Unified system (*7*) soils are classified according to their texture and plasticity and their performance as engineering construction material. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. GP and GW are clean gravels, and GM and GC are gravels that include, respectively, an appreciable amount of nonplastic and plastic fines. SP and SW are clean sands. SM and SC are sands that include fines of silt and clay. ML and CL are silts and clays that have a low liquid limit, and MH and CH are silts and clays that have a high liquid limit. Soils on the borderline between two classes are designated by symbols for both classes; for example, SP-SM.

Soil scientists use the USDA textural classification (*5*). In this, the texture of the soil is determined according to the proportion of soil particles smaller than 2 millimeters in diameter; that is, the proportion of sand, silt, and clay. Textural modifiers, such as gravelly, stony, shaly, and cobbly, are used as needed.

Table 6 shows the estimated classification of all the soils in the county according to all three systems of classification.

Estimated properties of the soils

Table 6 gives, for all the soils in the county, estimates of soil properties that are significant to engineering. Engineering test data from selected soils in Daviess and surrounding counties were used as a basis for making the estimates. This was done by comparing the soils of Daviess County with those soils that were sampled and tested, and the estimates also are based on experience gained from working with and observing similarly classified soils in other areas. These estimates provide information about the soils that an engineer would otherwise have to obtain for himself. However, the estimates are not a substitute for the detailed tests needed at a specific site selected for construction.

The information in table 6 generally applies to a depth of 5 feet or less. Most soils in the county are deep enough over bedrock that bedrock generally does not affect their use. Sandstone and shale are at a depth of about 20 to 48 inches in Berks soils and at a depth of 48 to 72 inches in Zanesville soils. Shale, siltstone, and sandstone are at a depth of 20 to 36 inches in Gilpin soils.

Some terms used in table 6 are explained in the following paragraphs.

Depth from surface normally shows only the depth for the major horizons. Special horizons are listed if they have engineering properties significantly different from the adjacent horizons.

Percentage passing sieve provides estimates rounded off to the nearest 5 percent. If there is little gravel-size material present (No. 10 sieve), the percentage of material

TABLE 6.—*Estimated soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soil for referring to other series that appear in the first column of this table

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification: USDA texture	Classification: Unified	Classification: AASHO
	Feet	*Inches*			
Alford: AlB2, AlB3, AlC2, AlC3, AlD2, AlD3, AlE2, AlE3.	>6	0–13	Silt loam	ML or CL	A-4 or A-6
		13–35	Silty clay loam and silt loam	CL	A-6
		35–60	Silt loam	ML or CL	A-4 or A-6
Armiesburg: Ar	>6	0–60	Silty clay loam	CL or CH	A-7
Ayrshire: Ay	1–3	0–19	Fine sandy loam	SM or ML	A-4
		19–43	Sandy clay loam	SC or CL	A-6
		43–60	Stratified fine sandy loam and fine sand.	SM	A-2
Bartle: Ba	1–3	0–20	Silt loam	ML or CL	A-4 or A-6
		20–39	Heavy silt loam (fragipan)	ML or CL	A-4 or A-6
		39–70	Silty clay loam	ML or CL	A-4 or A-6
		70–112	Silty clay loam	CL	A-6
Berks. Mapped only with Gilpin soils.	>6	0–30	Channery silt loam	ML	A-4
		30	Sandstone and shale bedrock.		
Bloomfield: BlB, BlC, BlD, BlF	>6	0–70	Loamy fine sand	SM	A-2
		70–80	Fine sand	SP	A-3
Bonnie: Bo	<1	0–60	Silt loam	ML or CL	A-4 or A-6
Cincinnati: CcB2, CcC2, CcC3, CcD2, CcD3.	>6	0–10	Silt loam	ML	A-4
		10–25	Light silty clay loam	CL	A-6
		25–42	Light silty clay loam (fragipan)	CL	A-6
		42–85	Light clay loam to silty clay loam.	CL	A-6
		85–110	Loam	CL	A-6
Cuba: Cu	>6	0–60	Silt loam and loam	ML	A-4
Elston: En	>6	0–23	Loam	ML	A-4
		23–36	Light sandy clay loam	SC or CL	A-4 or A-6
		36–65	Sandy loam and stratified sand	SM	A-2
*Gilpin: GbF. For Berks part of this unit, see Berks series.	>6	0–8	Silt loam	ML	A-4
		8–22	Light silty clay loam and silty clay loam.	ML or CL	A-4 or A-6
		22–30	Loam and fine sandy loam (70 percent weathered fragments).	SM	A-2 or A-4
		30	Bedrock.		
Haymond: Hd	>6	0–60	Silt loam	ML	A-4
Hickory: HkE2, HkF	>6	0–10	Silt loam	ML or CL	A-4 or A-6
		10–60	Clay loam	CL	A-6 or A-7
Hosmer: HoA, HoB2, HoB3, HoC2, HoC3, HoD2, HoD3.	>6	0–17	Silt loam	ML	A-4 or A-6
		17–33	Light silty clay loam	CL	A-6 or A-7
		33–62	Heavy silt loam (fragipan)	CL	A-6
		62–98	Silt loam	ML or CL	A-4 or A-6
Iona: IoA, IoB2	3–6	0–11	Silt loam	ML or CL	A-4 or A-6
		11–32	Silty clay loam	CL	A-6
		32–60	Silt loam	ML or CL	A-4 or A-6
Iva: IvA, IvB2	1–3	0–18	Silt loam	ML or CL	A-4 or A-6
		18–40	Silty clay loam	CL	A-6
		40–60	Silt loam	ML or CL	A-4 or A-6
Kings: Kn	<1	0–50	Silty clay and silty clay loam	CH	A-7

See footnotes at end of table.

significant to engineering

in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions
The symbol > means more than; the symbol < means less than]

Percentage passing sieve— No. 10 (2.0 mm.)	Percentage passing sieve— No. 40 (0.42 mm.)	Percentage passing sieve— No. 200 (0.074 mm.)	Permeability	Available water capacity	Reaction	Frost potential	Shrink-swell potential
			Inches per hour	*Inches per inch of soil*	*pH*		
100	90–100	85–95	0. 63–2. 0	0. 17–0. 20	5. 6–7. 3	Moderate	Low.
100	95–100	85–95	0. 63–2. 0	0. 19–0. 21	5. 6–6. 0	Moderate	Low.
100	90–100	85–95	0. 63–2. 0	0. 17–0. 20	5. 6–6. 0	Moderate	Low.
100	95–100	85–95	0. 20–0. 63	0. 19–0. 20	6. 6–7. 3	Low	Moderate.
100	75–85	40–55	2. 0–6. 30	0. 12–0. 17	6. 1–7. 3	Low	Low.
100	80–90	40–55	0. 63–2. 0	0. 19–0. 21	5. 6–6. 5	Low	Low.
95–100	65–75	25–35	0. 63–2. 0	0. 12–0. 17	7. 4–7. 8	Low	Low.
100	90–100	80–90	0. 63–2. 0	0. 17–0. 20	5. 6–7. 0	High	Low.
100	90–100	70–80	<0. 06	[1] 0. 06–0. 08	4. 5–5. 5	High	Low.
100	90–100	85–95	<0. 06	[1] 0. 06–0. 08	5. 0–5. 5	Moderate	Moderate.
100	95–100	95–100	0. 63–2. 0	[1] 0. 06–0. 08	5. 5–7. 3	Moderate	Moderate.
70–80	55–70	50–60	0. 63–2. 0	0. 12–0. 17	4. 4–5. 5	Low	Low.
100	50–75	15–30	6. 30–20. 0	<0. 08	5. 6–6. 0	Low	Low.
100	65–80	0–5	6. 30–20. 0	<0. 08	7. 4–7. 8	Low	Low.
100	90–100	85–95	0. 06–0. 2	0. 17–0. 20	4. 5–6. 0	High	Low.
100	90–100	85–95	0. 63–2. 0	0. 17–0. 20	5. 6–6. 0	Moderate to high	Low.
100	95–100	85–95	0. 63–2. 0	0. 17–0. 20	4. 5–5. 5	Moderate to high	Moderate.
100	95–100	85–95	<0. 06	[1] 0. 06–0. 08	4. 5–5. 5	Moderate	Moderate.
100	95–100	80–90	0. 06–0. 20	[1] 0. 06–0. 08	4. 5–6. 0	Moderate	Moderate.
95–100	85–95	75–85	0. 63–2. 0	[1] 0. 06–0. 08	5. 1–6. 6	Moderate	Low.
100	80–90	75–85	0. 63–2. 0	0. 17–0. 20	4. 5–5. 5	Low	Low.
100	80–90	75–85	0. 63–2. 0	0. 17–0. 20	5. 6–6. 0	Low	Low.
100	80–90	45–70	0. 63–2. 0	0. 12–0. 17	5. 1–5. 5	Low	Low.
100	55–70	15–30	2. 0–6. 30	0. 08–0. 12	6. 1–6. 5	Low	Low.
75–85	60–90	60–70	0. 63–2. 0	0. 17–0. 20	4. 4–5. 5	Low	Low.
85–95	75–85	50–60	0. 63–2. 0	0. 17–0. 20	4. 4–5. 5	Low	Low.
80–90	65–75	30–40	0. 63–2. 0	0. 12–0. 17	4. 4–5. 5	Low	Low.
100	80–90	75–85	0. 63–2. 0	0. 17–0. 20	6. 6–7. 3	Low	Low.
100	85–100	85–95	0. 63–2. 0	0. 17–0. 20	4. 5–5. 0	Low	Low.
100	90–100	85–95	0. 63–2. 0	0. 19–0. 21	[2] 4. 5–6. 0	Low	Moderate.
100	90–100	85–95	0. 63–2. 0	0. 17–0. 20	4. 5–5. 5	Moderate	Low.
100	90–100	85–95	0. 63–2. 0	0. 17–0. 20	4. 5–5. 5	Moderate	Moderate.
100	90–100	85–95	<0. 06	[1] 0. 06–0. 08	4. 5–5. 5	Moderate	Low.
100	90–100	85–95	0. 63–2. 0	[1] 0. 06–0. 08	4. 5–6. 0	Moderare	Low.
100	90–100	85–95	0. 63–2. 0	0. 17–0. 20	6. 1–6. 5	Moderate	Low.
100	95–100	85–95	0. 20–0. 63	0. 19–0. 21	5. 6–6. 0	Moderate	Low to moderate.
100	90–100	85–95	0. 63–2. 0	0. 17–0. 20	6. 6–7. 8	Moderate	Low.
100	90–100	85–95	0. 63–2. 0	0. 17–0. 20	5. 6–6. 5	High	Low.
100	95–100	85–95	0. 06–0. 2	0. 19–0. 21	5. 6–6. 5	High	Moderate.
100	90–100	85–95	0. 63–2. 0	0. 17–0. 20	6. 1–6. 5	High	Low.
100	95–100	90–100	<0. 06	0. 19–0. 21	6. 6–7. 8	High	High.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification: USDA texture	Classification: Unified	Classification: AASHO
	Feet	*Inches*			
Lyles: Ls, Ly	<1	0–22	Fine sandy loam	SM or ML	A–4
		22–47	Light sandy clay loam	SC	A–6
		47–60	Stratified sandy loam to fine sand.	SM	A–2
Markland: MaB2, MaD2	>6	0–12	Silt loam and light silty clay	ML or CL	A–6
		12–60	Silty clay	CH	A–7
McGary: Mg	1–3	0–10	Silt loam	ML or CL	A–4 or A–6
		10–50	Silty clay	CH	A–7
Montgomery: Mo	<1	0–50	Silty clay loam and silty clay	CH	A–7
Negley: NeF	>6	0–11	Loam	ML	A–4
		11–53	Clay loam and sandy clay loam	CL or SC	A–6
		53–65	Sand	SP–SM	A–2
Nolin: No	>6	0–40	Light silty clay loam	CL	A–6
		40–50	Silt loam	ML	A–4
Parke: PaB2, PaC2, PaC3, PaD2	>6	0–14	Silt loam	ML	A–4
		14–55	Clay loam and silty clay loam	CL	A–6
		55–70	Sandy clay loam	SC or CL	A–6
Peoga: Pe	<1	0–23	Silt loam	ML or CL	A–4 or A–6
		23–55	Silty clay loam	CL	A–6
		55–90	Silty clay loam and silt loam	ML or CL	A–4 or A–6
Petrolia: Po	<1	0–40	Silty clay loam	CL	A–6
		40–50	Stratified silty clay loam and silt loam.	CL	A–4 or A–6
Princeton: PrA, PrB2, PrC2, PrD2.	>6	0–12	Fine sandy loam	SM	A–4
		12–31	Sandy clay loam	SC or CL	A–4
		31–48	Sandy loam	SM or ML	A–4
		48–60	Fine sand	SP	A–3
Ragsdale: Ra	<1	0–17	Silt loam	ML or CL	A–4 or A–6
		17–54	Silty clay loam	CL	A–6
		54–65	Silt loam	ML	A–4
Reesville: Re	1–3	0–8	Silt loam	ML or CL	A–4
		8–33	Silty clay loam	CL	A–6
		33–50	Silt loam	ML or CL	A–4 or A–6
Ross: Ro	>6	0–19	Loam	ML	A–4
		19–50	Light clay loam and loam	CL	A–6
Stendal: Sr	1–3	0–31	Silt loam	ML	A–4
		31–56	Silt loam and very fine sand	ML or SM	A–4
Strip mines: St. Properties too variable to rate.					
Vigo: Vg	1–3	0–22	Silt loam	ML	A–4
		22–72	Silty clay loam	CL	A–6
Vincennes: Vn	<1	0–9	Clay loam	CL	A–4
		9–55	Clay loam	CL	A–6
		55–65	Stratified clay loam, sandy loam, and fine sand.	ML or CL	A–4 or A–6
Wakeland: Wa	1–3	0–50	Silt loam	ML	A–4

See footnotes at end of table.

significant to engineering—Continued

Percentage passing sieve— No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	Permeability	Available water capacity	Reaction	Frost potential	Shrink-swell potential
			Inches per hour	*Inches per inch of soil*	*pH*		
100	75–85	40–55	0.63–2.0	0.12–0.17	6.6–7.3	Low	Low.
100	80–90	40–50	0.63–2.0	0.19–0.21	6.6–7.3	Low	Low.
95–100	65–75	25–35	2.0–6.3	0.12–0.17	7.4–7.8	Low	Low.
100	90–100	85–95	0.63–2.0	0.17–0.20	5.6–6.5	Moderate	Low.
100	95–100	90–100	0.06–0.2	0.19–0.21	[3] 5.1–5.5	Low	High.
100	90–100	85–95	0.63–2.0	0.17–0.20	6.1–7.3	High	Low.
100	95–100	90–100	0.06–0.2	0.19–0.21	[4] 5.6–6.0	Moderate	High.
100	95–100	90–100	<0.06	0.19–0.21	[5] 6.1–6.5	High	High.
100	90–100	85–95	0.63–2.0	0.17–0.20	4.5–6.0	Low	Low.
100	80–90	40–75	0.63–2.0	0.19–0.20	4.5–5.5	Low	Low.
100	65–80	5–12	6.30–20.0	<0.08	7.4–7.8	Low	Low.
100	95–100	85–95	0.63–2.0	0.19–0.21	6.6–7.3	High	Low.
100	95–100	85–95	0.63–2.0	0.19–0.21	6.6–7.3	High	Low.
100	90–100	85–95	0.63–2.0	0.17–0.20	5.1–6.0	Moderate	Low.
100	90–100	90–95	0.63–2.0	0.19–0.21	4.5–5.0	Moderate	Low.
100	80–90	40–55	0.63–2.0	0.19–0.21	5.6–7.3	Low	Low
100	90–100	85–95	0.63–2.0	0.17–0.20	5.6–6.0	High	Low.
100	95–100	85–95	<0.06	0.19–0.21	4.5–5.5	High	Moderate.
100	90–100	85–95	0.06–0.2	0.17–0.20	4.5–6.5	High	Low to moderate.
100	95–100	85–95	0.20–0.63	0.19–0.21	6.6–7.8	High	Moderate.
100	95–100	85–95	0.20–0.63	0.19–0.21	7.4–7.8	High	Moderate.
100	75–85	35–45	2.0–6.3	0.12–0.17	5.6–6.5	Low	Low.
100	80–90	40–55	0.63–2.0	0.19–0.21	5.1–6.0	Low	Low.
100	75–85	40–55	2.0–6.3	0.12–0.17	5.6–6.5	Low	Low.
100	65–80	0–5	6.3–20.0	<0.08	7.4–7.8	Low	Low.
100	90–100	85–95	0.63–2.0	0.17–0.20	6.1–7.3	High	Low.
100	95–100	85–95	0.06–0.2	0.19–0.21	6.1–7.3	High	Moderate.
100	90–100	85–95	0.63–2.0	0.17–0.20	6.6–7.8	High	Low.
100	90–100	85–95	0.63–2.0	0.17–0.20	6.6–7.3	High	Low.
100	95–100	85–95	0.06–0.2	0.19–0.21	5.1–6.0	High	Moderate.
100	100	85–95	0.20–0.63	0.17–0.20	6.6–7.8	Moderate	Low.
100	85–90	75–85	0.63–2.0	0.17–0.20	6.6–7.3	Low to moderate	Low.
100	85–90	75–90	0.63–2.0	0.17–0.20	6.6–7.8	Low to moderate	Low.
100	90–100	85–95	0.63–2.0	0.17–0.20	4.5–6.5	High	Low.
100	85–95	45–65	0.63–2.0	0.12–0.17	4.5–5.0	High	Low.
100	90–100	85–95	0.63–2.0	0.17–0.20	4.5–5.5	High	Low.
100	95–100	85–95	<0.06	0.19–0.21	4.5–5.5	Moderate	Moderate.
100	90–100	75–85	0.63–2.0	0.17–0.20	5.6–6.0	Moderate	Low.
100	90–100	80–90	0.06–0.2	0.19–0.20	4.5–5.5	Moderate	Moderate.
100	65–85	55–70	0.63–2.0	0.17–0.20	5.1–6.0	Moderate	Low.
100	90–100	85–95	0.63–2.0	0.17–0.20	6.6–7.3	High	Low.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification: USDA texture	Classification: Unified	Classification: AASHO
	Feet	*Inches*			
Wellston: WeD2, WeD3, WeE, WeF.	>6	0–10	Silt loam	ML	A–4
		10–34	Silty clay loam	CL	A–6
		34–42	Silt loam	ML or CL	A–4 or A–6
		42	Bedrock.		
Zanesville: ZaB2, ZaC2, ZaC3, ZaD2, ZaD3.	>6	0–14	Silt loam	ML	A–4
		14–31	Silty clay loam	ML or CL	A–4 or A–6
		31–60	Silt loam (fragipan)	ML or CL	A–4 or A–6
Zipp: Zp, Zs	<1	0–50	Silty clay	CH	A–7

[1] Available water capacity is limited by fragipan, which restricts water movement and root penetration.
[2] Reaction given is to a depth of 46 inches; pH is 7.4–7.8 below that depth.
[3] Reaction given is to a depth of 33 inches; pH is 6.6–8.4 below that depth.

TABLE 7.—*Engineering interpretations*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in referring to other series that appear

Soil series and map symbols	Suitability as a source of—: Topsoil	Suitability as a source of—: Sand and gravel	Suitability as a source of—: Road fill	Soil features affecting—: Highway location	Soil features affecting—: Dikes, levees, and embankments
Alford: AlB2, AlB3, AlC2, AlC3, AlD2, AlD3, AlE2, AlE3.	Good	Not suitable.	Poor: fair to poor shear strength; medium to high compressibility; fair to good compaction and stability.	Subject to frost heave; needs cuts and fills; erodible on side slopes.	Low to moderate permeability when compacted; fair resistance to piping.
Armiesburg: Ar	Poor: silty clay loam.	Not suitable.	Poor: moderate shrink-swell potential; fair to poor shear strength; fair compaction; subject to frost heave; fair stability; high compressibility.	Subject to occasional flooding; subject to frost heave.	Low to moderate permeability when compacted; good resistance to piping; fair stability and compaction; high compressibility; moderate shrink-swell potential.
Ayrshire: Ay	Fair: somewhat droughty.	Not suitable.	Poor in subsoil; good in substratum.	Seasonal high water table.	Subsoil has fair to good stability and compaction and good resistance to piping; substratum has poor stability, high permeability when compacted, and fair to poor resistance to piping.
Bartle: Ba	Fair: low organic-matter content.	Not suitable	Fair to poor in subsoil: moderate shrink-swell potential; seasonal high water table; medium to high compressibility.	Seasonal high water table; subject to frost heave; medium to high compressibility.	Moderate to low permeability when compacted; medium to high compressibility; fair resistance to piping.
Berks. Mapped only with Gilpin soils.	Poor: thin	Not suitable	Poor: 20 to 48 inches to bedrock.	Needs cuts and fills; 20 to 48 inches to bedrock.	Bedrock at depth of 20 to 48 inches.

See footnote at end of table.

significant to engineering—Continued

Percentage passing sieve— No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	Permeability	Available water capacity	Reaction	Frost potential	Shrink-swell potential
			Inches per hour	*Inches per inch of soil*	*pH*		
100	90–100	85–95	0.63–2.0	0.17–0.20	4.5–5.5	Moderate	Low.
100	95–100	85–95	0.63–2.0	0.17–0.20	4.5–5.0	Moderate	Low.
85–100	75–85	65–75	0.63–2.0	0.17–0.20	4.5–5.0	Low	Low.
100	90–100	85–95	0.63–2.0	0.17–0.20	4.5–6.0	High	Low.
100	95–100	85–95	0.63–2.0	0.19–0.21	4.5–5.0	High	Low.
100	85–95	75–85	<0.06	[1] 0.06–0.08	4.5–5.0	Low	Low.
100	95–100	95–100	<0.06	0.19–0.21	[6] 6.6–7.3	High	High.

[4] Reaction given is to a depth of 21 inches; pH is 6.6–8.4 below that depth.
[5] Reaction given is to a depth of 13 inches; pH is 6.6–8.4 below that depth.
[6] Reaction given is to a depth of 17 inches; pH is 7.4–8.4 below that depth.

of soil properties

such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for in the first column of this table]

Soil features affecting—Continued: Pond reservoirs	Agricultural drainage	Terraces and diversions	Grassed waterways	Foundations for low buildings	Soil limitations for septic tank filter fields
Moderate seepage rate.	(1)	Subject to erosion; not suited on slopes greater than 12 percent.	Subject to severe erosion during construction.	Well drained; medium to high compressibility; low shrink-swell potential; fair to poor shear strength.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if more than 12 percent.
Moderate to slow seepage rate; subject to flooding.	(1)	(1)	(1)	Well drained; subject to flooding; fair to poor shear strength; moderate shrink-swell potential; high compressibility.	Severe: subject to occasional flooding.
Moderate seepage rate.	Seasonal high water table.	(1)	(1)	Seasonal high water table; medium compressibility in subsoil, low in underlying material.	Moderate: high water table at certain seasons of the year.
Seasonal high water table; very slow permeability in fragipan; nearly level slopes.	Seasonal high water table; very slow permeability in fragipan.	(1)	(1)	Seasonal high water table; medium to high compressibility.	Severe: high water table; very slow permeability.
Bedrock at depth of 20 to 48 inches.	(1)	(1)	(1)	Steep slopes; 20 to 48 inches to bedrock.	Severe if slope is greater than 12 percent; 20 to 48 inches to bedrock.

TABLE 7.—*Engineering interpretations*

Soil series and map symbols	Suitability as a source of—			Soil features affecting—	
	Topsoil	Sand and gravel	Road fill	Highway location	Dikes, levees, and embankments
Bloomfield: BlB, BlC, BlD, BlF.	Poor: low organic-matter content; low available moisture capacity.	Fair: some inter-bedded sand.	Good	Deep sand; needs cuts and fills; difficult to vegetate exposed cuts.	Fair to poor resistance to piping; moderate to high permeability when compacted; fair to poor stability; fair compaction.
Bonnie: Bo	Fair to good: low organic-matter content.	Not suitable	Fair to poor: fair to poor stability and compaction; subject to frost heave; poor shear strength; medium compressibility.	High water table, subject to flooding; high susceptibility to frost heave.	Fair to poor stability and compaction; poor resistance to piping; moderate permeability when compacted; medium compressibility.
Cincinnati: CcB2, CcC2, CcC3, CcD2, CcD3.	Fair: low organic-matter content.	Not suitable	Poor: fair shear strength; medium to high compressibility; fair to good compaction and stability.	Needs cuts and fills; seepage areas; subject to frost heave.	Fair to good stability and compaction; good resistance to piping; medium to high compressibility; low permeability when compacted.
Cuba: Cu	Good	Not suitable	Fair: poor shear strength; medium compressibility; low shrink-swell potential; poor stability and compaction.	Subject to flooding and frost heave.	Poor stability and compaction; moderate permeability when compacted; poor resistance to piping; medium compressibility.
Elston: En	Good	Possible source of sand below a depth of 60 inches.	Good	Subject to soil blowing	Fair to good stability and compaction; moderate permeability when compacted; fair to poor resistance to piping.
*Gilpin: GbF. For Berks part of this unit, see Berks series.	Good	Not suitable	Fair: low shrink-swell potential; subject to frost heave; medium compressibility; 20 to 36 inches to bedrock.	Needs cuts and fills; erodible on side slopes; 20 to 36 inches to bedrock.	Bedrock at depth of 20 to 36 inches; fair stability and compaction; medium compressibility.
Haymond: Hd	Good	Not suitable	Fair: poor shear strength; medium compressibility; low shrink-swell potential; poor stability and compaction.	Subject to flooding and frost heave.	Poor stability and compaction; moderate permeability when compacted; poor resistance to piping.
Hickory: HkE2, HkF.	Fair to poor: thin; low organic-matter content.	Not suitable	Poor: fair to poor shear strength; medium to high compressibility; fair compaction and stability.	Needs cuts and fills	Fair stability and compaction; low permeability when compacted; good resistance to piping; medium to high compressibility.
Hosmer: HoA, HoB2, HoB3, HoC2, HoC3, HoD2, HoD3.	Good	Not suitable	Poor: fair to poor shear strength; fair stability and compaction; medium to high compressibility.	Needs cuts and fills; erodible on slopes; seepage areas; subject to frost heave.	Fair stability and compaction; low to moderate permeability when compacted; fair resistance to piping.

See footnote at end of table.

of soil properties—Continued

Soil features affecting—Continued					Soil limitations for septic tank filter fields
Pond reservoirs	Agricultural drainage	Terraces and diversions	Grassed waterways	Foundations for low buildings	
Rapid seepage rate	(1)	(1)	(1)	Low compressibility; low shrink-swell potential; fair to good shear strength.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if more than 12 percent. Possible contamination of underground water supplies.
High water table; subject to seepage.	High water table; outlet for tile generally inadequate; subject to flooding.	(1)	(1)	Subject to flooding; high water table; medium compressibility; poor shear strength.	Severe: high water table; subject to flooding.
Slow seepage rate; features generally favorable.	(1)	Very slow permeability in fragipan at a depth of about 24 inches.	Very slow permeability in fragipan in subsoil.	Fair shear strength; medium to high compressibility; low to moderate shrink-swell potential.	Severe: very slow permeability.
Subject to flooding; subject to seepage.	(1)	(1)	(1)	Subject to flooding; medium compressibility; poor shear strength.	Severe: subject to flooding.
Rapid seepage rate	(1)	(1)	(1)	Medium to slight compressibility.	Slight.
Bedrock at depth of 20 to 36 inches; moderate seepage rate.	(1)	(1)	(1)	Bedrock at depth of 20 to 36 inches; steep slopes.	Severe if slope is greater than 12 percent; 20 to 30 inches to bedrock.
Subject to flooding; subject to seepage.	(1)	(1)	(1)	Subject to flooding; medium compressibility; poor shear strength.	Severe: subject to flooding.
Moderate to slow seepage rate.	(1)	(1)	Moderately steep to very steep slopes; high erosion potential.	Medium to high compressibility; moderate shrink-swell potential; fair to poor shear strength.	Severe if slope is more than 12 percent.
Slow seepage rate	(1)	Very slow permeability in fragipan.	Very slow permeability in fragipan.	Medium to high compressibility; moderate shrink-swell potential; fair to poor shear strength.	Severe: very slow permeability in fragipan.

TABLE 7.—*Engineering interpretations*

Soil series and map symbols	Suitability as a source of—			Soil features affecting—	
	Topsoil	Sand and gravel	Road fill	Highway location	Dikes, levees, and embankments
Iona: IoA, IoB2	Good	Not suitable	Fair to poor: fair stability and compaction; medium compressibility.	Moderately well drained; subject to frost heave.	Fair stability and compaction; moderate to low permeability when compacted; fair resistance to piping.
Iva: IvA, IvB2	Good	Not suitable	Fair to poor: fair stability and compaction; medium compressibility; seasonal high water table; fair to poor shear strength.	Seasonal high water table; subject to frost heave.	Fair stability and compaction; fair resistance to piping; moderate to low permeability when compacted.
Kings: Kn	Poor: clayey	Not suitable	Poor: high shrink-swell potential; high compressibility; fair to poor stability and compaction; poor shear strength.	High water table; subject to ponding; high shrink-swell potential; high compressibility.	Fair to poor stability and compaction; low permeability when compacted; good resistance to piping.
Lyles: Ls, Ly	Good	Not suitable	Fair to good: high water table; fair stability and compaction; slight to medium compressibility; fair shear strength.	Seasonal high water table; subject to ponding and frost heave.	Fair stability and compaction; moderate permeability when compacted; slight to medium compressibility; poor resistance to piping.
Markland: MaB2, MaD2.	Fair: thin	Not suitable	Poor: high shrink-swell potential; high compressibility; fair to poor stability and compaction; poor shear strength.	Plastic soil material; needs cuts and fills.	Fair to poor stability and compaction; low permeability when compacted; high shrink-swell potential; high compressibility; good resistance to piping.
McGary: Mg	Poor: silty clay at a depth of about 10 inches.	Not suitable	Poor: high shrink-swell potential; fair to poor stability and compaction; poor shear strength.	Seasonal high water table; plastic soil material; subject to frost heave; high shrink-swell potential.	Fair to poor stability and compaction; low permeability when compacted; high shrink-swell potential; high compressibility.
Montgomery: Mo	Poor: silty clay.	Not suitable	Poor: high shrink-swell potential; high water table; subject to ponding; fair to poor stability and compaction; high compressibility.	High water table; subject to ponding; subject to frost heave; high shrink-swell potential.	Fair to poor stability and compaction; high compressibility; poor shear strength; good resistance to piping; high shrink-swell potential.
Negley: NeF	Good	Good to fair; mixed sand and gravel below a depth of 5 feet.	Fair in subsoil: fair stability; fair to good compaction; medium to low compressibility; fair shear strength. Good in substratum: fair stability and compaction.	Needs cuts and fills; erodible on side slopes.	Subsoil has fair stability, fair to good compaction, low permeability when compacted, medium to low compressibility, good resistance to piping; substratum has fair stability and compaction; moderate to high permeability when compacted, slight compressibility, poor to fair resistance to piping.

See footnote at end of table.

of soil properties—Continued

Soil features affecting—Continued					Soil limitations for septic tank filter fields
Pond reservoirs	Agricultural drainage	Terraces and diversions	Grassed waterways	Foundations for low buildings	
Moderate seepage rate.	(1)	Features generally flavorable.	Features generally favorable.	Medium compressibility; fair to poor shear strength.	Severe: moderately slow permeability.
Seasonal high water table; moderate seepage rate.	Seasonal high water table; slow permeability.	Features generally favorable.	Features generally favorable.	Seasonal high water table; medium compressibility; moderate shrink-swell potential; fair to poor shear strength.	Severe: seasonal high water table; slow permeability.
High water table; subject to ponding; slow seepage rate.	Seasonal ponding; very slow permeability.	(1)	(1)	High water table; subject to ponding; high compressibility; high shrink-swell potential.	Severe: subject to flooding.
Subject to seepage; seasonal high water table.	Seasonal high water table; subject to ponding.	(1)	(1)	Seasonal high water table; slight to medium compressibility; fair shear strength.	Severe: seasonal high water table; subject to flooding.
Slow seepage rate	(1)	Many short, irregular slopes; slow permeability.	Difficult to establish cover.	High shrink-swell potential; poor shear strength; high compressibility.	Severe: slow permeability in subsoil.
High water table; slow seepage rate.	High water table; slow permeability in subsoil.	(1)	(1)	Seasonal high water table; high compressibility; high shrink-swell potential; poor shear strength.	Severe: seasonal high water table; slow permeability in subsoil.
High water table; subject to ponding; slow seepage rate.	Seasonal ponding; very slow permeability.	(1)	(1)	High water table; subject to ponding; high shrink-swell potential and compressibility; poor shear strength.	Severe: seasonal high water table; very slow permeability.
Moderate seepage rate; deep excavation could expose highly permeable sand and gravel materials.	(1)	(1)	Steep to very steep; high erosion potential.	Subsoil has medium to low compressibility, fair shear strength, low shrink-swell potential; substratum has slight compressibility, fair shear strength, low shrink-swell potential.	Severe if slope is more than 12 percent.

TABLE 7.—*Engineering interpretations*

Soil series and map symbols	Suitability as a source of—			Soil features affecting—	
	Topsoil	Sand and gravel	Road fill	Highway location	Dikes, levees, and embankments
Nolin: No	Good	Not suitable	Poor in subsoil: fair to good stability; medium to high compressibility; fair to good shear strength; substratum has poor stability and compaction, medium compressibility, and poor shear strength.	Subject to flooding and frost heave.	Subsoil has fair to good stability and compaction, low permeability when compacted, medium to high compressibility, good resistance to piping; substratum has poor stability and compaction, moderate permeability when compacted, medium compressibility, poor resistance to piping.
Parke: PaB2, PaC2, PaC3, PaD2.	Good	Not suitable	Poor: low shrink-swell potential; fair shear strength; fair stability; medium to high compressibility; fair to good compaction.	Needs cuts and fills; erodible on side slopes; subject to frost heave.	Low to moderate permeability when compacted; fair resistance to piping; fair stability.
Peoga: Pe	Fair: seasonal high water table.	Not suitable	Fair to poor: fair to poor shear strength; seasonal high water table; fair stability and compaction; medium compressibility.	Seasonal high water table; subject to frost heave.	Fair: medium compressibility and stability; fair resistance to piping; moderate to low permeability when compacted.
Petrolia: Po	Poor: silty clay loam.	Not suitable	Poor: fair to good stability and compaction; medium to high compressibility; fair to good compaction; fair shear strength.	Subject to flooding; high water table; high frost potential; moderate shrink-swell potential.	Fair to good stability and compaction; good resistance to piping; medium to high compressibility; low permeability when compacted.
Princeton: PrA, PrB2, PrC2, PrD2,	Fair: low available moisture capacity.	Poor: minor amounts of stratified sand.	Fair: fair stability; fair to good compaction; slight compressibility; fair shear strength.	Needs cuts and fills; unstable and difficult to vegetate.	Fair stability; fair to good compaction; moderate permeability when compacted; slight compressibility; fair resistance to piping.
Ragsdale: Ra	Good	Not suitable	Fair to poor: medium compressibility; fair stability and compaction; fair to poor shear strength; seasonal high water table.	Seasonal high water table; subject to frost heave and to ponding.	Fair stability and compaction; fair resistance to piping; moderate to low permeability when compacted; medium to high compressibility.
Reesville: Re	Good	Not suitable	Poor to fair: medium to high compressibility; fair stability and compaction; seasonal high water table; fair shear strength.	Seasonal high water table; subject to frost heave.	Fair stability and compaction; fair resistance to piping; moderate to low permeability when compacted; medium to high compressibility.
Ross: Ro	Good	Not suitable	Fair to poor: fair to poor shear strength and compaction; medium to high compressibility; low shrink-swell potential; fair stability.	Subject to flooding and frost heave.	Fair stability: fair to poor shear strength and compaction; medium to high compressibility; moderate to low permeability when compacted; fair resistance to piping.

See footnote at end of table.

of soil properties—Continued

Soil features affecting—Continued					Soil limitations for septic tank filter fields
Pond reservoirs	Agricultural drainage	Terraces and diversions	Grassed waterways	Foundations for low buildings	
Subject to flooding; subject to seepage; moderate seepage rate.	(1)	(1)	(1)	Subject to flooding; medium to high compressibility; fair to poor shear strength.	Severe: subject to flooding.
Rapid seepage rate	(1)	Subject to erosion; not suited on slopes greater than 12 percent.	Subject to severe erosion during construction.	Well drained; medium to high compressibility; fair shear strength.	Slight if slope is 2 to 6 percent, moderate if 6 to 12 percent, and severe if more than 12 percent.
Seasonal high water table; very slow permeability; nearly level slopes.	Seasonal high water table; tile outlet generally inadequate; very slow permeability.	(1)	(1)	Seasonal high water table; medium compressibility; fair to poor shear strength.	Severe: seasonal high water table; very slow permeability.
Subject to flooding and seepage.	Subject to flooding; seasonal high water table; moderately slow permeability.	(1)	(1)	Seasonal high water table; subject to ponding; medium to high compressibility; moderate shrink-swell potential; fair shear strength.	Severe: high water table; subject to flooding; very slow permeability.
Rapid seepage rate in underlying material.	(1)	Short irregular slopes.	Subject to severe erosion during construction.	Features generally favorable.	Slight if slope is 0 to 6 percent, moderate if 6 to 12 percent, and severe if more than 12 percent.
High water table; slow seepage rate; moderate seepage rate in underlying material.	Seasonal high water table; slow permeability; subject to ponding.	(1)	(1)	Seasonal high water table; medium to high compressibility; moderate to low shrink-swell potential.	Severe: seasonal high water table; slow permeability.
High water table; moderate seepage rate in underlying silty material.	Seasonal high water table; slow permeability.	(1)	(1)	Seasonal high water table; medium to high compressibility; moderate to low shrink-swell potential.	Severe: seasonal high water table; slow permeability.
Subject to flooding; moderate to slow seepage rate.	(1)	(1)	(1)	Fair to poor shear strength; low shrink-swell potential; medium to high compressibility; subject to flooding.	Severe: subject to occasional overflow.

TABLE 7.—*Engineering interpretations*

Soil series and map symbols	Suitability as a source of—			Soil features affecting—	
	Topsoil	Sand and gravel	Road fill	Highway location	Dikes, levees, and embankments
Stendal: Sr	Good	Not suitable	Fair: low shrink-swell potential; fair to poor stability; fair to poor compaction; low to medium compressibility; fair to poor shear strength; seasonal high water table.	Subject to frost heave; seasonal high water table; subject to flooding.	Low to medium compressibility; moderate permeability when compacted; fair to poor stability and compaction; poor resistance to piping.
Strip mines: St. No interpretations. Properties too variable.					
Vigo: Vg	Fair: low in organic-matter content.	Not suitable	Poor: fair to good stability and compaction; medium to high compressibility; fair shear strength; seasonal high water table.	Seasonal high water table; subject to frost heave.	Fair to good stability and compaction; low permeability when compacted; medium to high compressibility; good resistance to piping.
Vincennes: Vn	Poor: clay loam.	Poor: somewhat interbedded sand and gravel at depth below 8 feet.	Fair to poor: fair stability and compaction; medium compressibility; fair to poor shear strength.	Seasonal high water table; subject to ponding and frost heave.	Moderate to low permeability when compacted; fair resistance to piping; medium compressibility; fair stability and compaction.
Wakeland: Wa	Good	Not suitable	Fair: low shrink-swell potential; poor stability and compaction; low to medium compressibility; fair to poor shear strength; seasonal water table.	Seasonal high water table; subject to flooding and frost heave.	Poor stability and compaction; poor resistance to piping; medium compressibility; moderate permeability when compacted.
Wellston: WeD2, WeD3, WeE, WeF.	Good	Not suitable	Poor: 40 to 60 inches to bedrock; fair stability and compaction; medium compressibility; fair to poor shear strength.	Needs cuts and fills; erodible on side slopes; 40 to 60 inches to bedrock.	Fair stability and compaction; low to moderate premeability when compacted; fair resistance to piping.
Zanesville: ZaB2, ZaC2, ZaC3, ZaD2, ZaD3.	Good	Not suitable.	Poor: fair stability and compaction; medium compressibility; fair to poor shear strength.	Needs cuts and fills; erodible on side slopes; subject to frost heave; 48 to 72 inches to bedrock.	Fair stability and compaction; medium compressibility; low to moderate permeability when compacted.
Zipp: Zp, Zs	Poor: silty clay.	Not suitable	Poor: high shrink-swell potential; high water table; subject to ponding; fair to poor stability and compaction; high compressibility.	High water table; subject to ponding and frost heave; high shrink-swell potential.	Fair to poor stability and compaction; high compressibility; poor shear strength; good resistance to piping; high shrink-swell potential.

[1] Practice not applicable or not needed.

of soil properties—Continued

Soil features affecting—Continued					Soil limitations for septic tank filter fields
Pond reservoirs	Agricultural drainage	Terraces and diversions	Grassed waterways	Foundations for low buildings	
High water table; subject to seepage.	Seasonal high water table; subject to flooding.	(1)	(1)	Subject to flooding; seasonal high water table; low to medium compressibility; low shrink-swell potential; fair to poor shear strength.	Severe: high water table; subject to frequent overflow.
High water table; slow seepage rate; nearly level topography.	Seasonal high water table; very slow permeability.	(1)	(1)	Seasonal high water table; medium to high compressibility; moderate shrink-swell potential; fair shear strength.	Severe: very slow permeability.
High water table; subject to seepage below a depth of 4 feet; nearly level.	Seasonal high water table; slow permeability.	(1)	(1)	Seasonal high water table; medium compressibility; moderate shrink-swell potential; fair to poor shear strength.	Severe: high water table; slow permeability.
Subject to seepage; high water table; subject to flooding.	Seasonal high water table; subject to flooding.	(1)	(1)	Subject to flooding; seasonal high water table; medium compressibility; low shrink-swell potential; fair to poor shear strength.	Severe: seasonal high water table; subject to flooding.
Fractured bedrock at depth of 40 to 60 inches.	(1)	(1)	Highly susceptible to erosion; bedrock at depth of 40 to 60 inches.	Bedrock at depth of 40 to 60 inches; medium compressibility; fair to poor shear strength.	Severe if slope is greater than 12 percent; 40 to 60 inches to bedrock.
Subject to seepage in underlying material.	(1)	Very slow permeability in fragipan; soil extremely difficult to vegetate; exposed fragipan.	Very slow permeability in fragipan; soil extremely difficult to vegetate; exposed fragipan.	Bedrock at depth of 48 to 72 inches; medium compressibility; fair to poor shear strength; fragipan at depth of 24 inches.	Severe: very slow permeability in fragipan.
High water table; subject to flooding; slow seepage rate.	High water table; seasonal ponding; very slow permeability.	(1)	(1)	High water table; subject to ponding; high shrink-swell potential and compressibility; poor shear strength.	Severe: very slow permeability; subject to ponding.

that passes the No. 200 sieve approximates the amount of silt and clay in a soil.

Permeability refers to movement of water downward through undisturbed soil material. Estimates are based largely on texture, structure, and consistency.

Available water capacity is the capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. The capacity of a particular horizon to deliver water to plant roots depends on whether the roots can reach the horizon.

Reaction refers to the estimated range in pH value for each major horizon of undisturbed soil.

Frost potential refers to heave caused by ice lenses that form in a soil and the subsequent loss of strength as a result of excess moisture during thawing periods. The three conditions that must exist for frost action to become a major consideration are (1) a susceptible soil, (2) a source of water during the freezing period; and (3) a suitable temperature that exists long enough for the freezing temperature to penetrate the ground.

Shrink-swell potential is that quality of the soil that determines its volume change with moisture content. It is estimated primarily on the basis of the amount and kind of clay in a soil.

Engineering interpretations of soil properties

In table 7 interpretations for engineering uses of the soils are given. The data in this table apply to the representative profile of each soil series. The representative profile is described in the section "Descriptions of the Soils."

Some features of a soil may be helpful in one kind of engineering work and a hindrance in another. For example, a highly permeable substratum is a feature that would render a soil undesirable as a site for a farm pond. However, it might be favorable for highway location.

Some terms used in table 7 are explained in the following paragraphs.

Topsoil.—This is soil material, preferably high in organic-matter content, that is used to topdress back slopes, embankments, lawns, and gardens. The suitability rating is based mainly on texture and organic-matter content.

Sand and gravel.—The rating applies to soil material within a depth of 5 to 7 feet. Sand or sand and gravel occur at variable depths within the same soil series. Test pits are needed to determine the extent and availability of sand or sand and gravel.

Road fill.—The rating is based on performance of soil material when used as borrow for subgrade. Both the subsoil and substratum are rated when they are contrasting in character.

Highway location.—Soil features considered are those that affect overall performance of the soil. The entire profile was evaluated, based on an undisturbed soil without artificial drainage.

Dikes, levees, and embankments.—The features considered are those that affect the use of disturbed soil material for constructing embankments to impound surface water.

Pond reservoirs.—The primary concerns are features of the undisturbed soil that affect the seepage rate (permeability).

Agricultural drainage.—Features are considered that affect the installation and performance of surface and subsurface drainage practices. Among such features are texture, permeability, topography, seasonal water table, and restricting layers.

Terraces and diversions.—Features that affect the layout and construction are considered. Among such features are topography, texture, and depth to soil material unfavorable to crop production.

Grassed waterways.—Features that affect the establishment, growth, and maintenance of vegetation and layout and construction are considered.

Foundations for low buildings.—Features and qualities of undisturbed soil that affect their suitability for supporting buildings up to 3 stories high. The major factors evaluated are shrink-swell potential, shear strength, flooding hazard, seasonal high water table, and compressibility of the soil.

Septic tank filter fields.—The factors evaluated are permeability, seasonal water table, flooding hazard, and topography.

Formation and Classification of the Soils

This section has three parts. The first part discusses the five major factors of soil formation. The second part discusses soil-forming processes that have been influential in the formation of soils in Daviess County. The third part deals with the classification of soils in Daviess County.

Factors of Soil Formation

Soil is produced by the action of soil-forming processes on material deposited or accumulated by natural forces. The characteristics of the soil at any given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and existed since accumulation; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of soil development have acted on the soil material.

Climate and vegetation are the active factors of soil formation. They act on the parent material that has accumulated through the weathering of rocks and slowly change it to a natural body that has genetically related horizons. The effects of climate and vegetation are conditioned by relief. The parent material also affects the kind of profile that can be formed and, in extreme cases, determines it almost entirely. Finally, time is needed for the changing of the parent material into a soil. The amount of time may be short or long, but some time is always required for soil horizons to form. Usually a long time is required for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one unless conditions are specified for the other four. Many of the processes of soil development are unknown.

Parent material

The parent material in which the soils of Daviess County formed consists of glacial till of Illinoian age; lacustrine deposits or lakebed material of Wisconsin and Illinoian ages; wind-transported sand and silt outwash of Wisconsin age; and residuum from sandstone and shale.

Some landscape development was present before glaciers of Illinoian age invaded a large part of the county from the north. The preglacial topography determined the most important features of the present landscape. Ice erosion acting on this landscape rounded the existing hills, deepened the valleys, and steepened the valley walls.

As the ice receded from the uplands, a mantle of mixed stones, sand, silt, and clay, known as glacial till, was left over the bedrock. An example of soils that formed in this material are the Hickory soils. The melting ice produced a large volume of water that carried large amounts of sand and gravel. The sand and gravel were deposited in stratified layers known as glacial outwash. Among the soils that formed in this material are the Elston soils. Both the glacial till and the glacial outwash are called glacial drift.

Glacial till on the ridges and slopes generally ranges from a few inches to 15 feet in depth. In the valleys the till extends to a depth of 50 feet or more in places. Stratified outwash deposits left by glacial streams are also present in preglacial valleys. Good examples of this valley-filling outwash are mostly in the western part of the county, just west of the sand hills. In parts of the county where glacial ice carried the debris only short distances, the mantle of till is thin and was derived mostly from the underlying rock. The deeper areas of drift consist of material that was carried mainly from areas hundreds of miles to the north.

As the glacial ice receded, lakes were formed in many of the valleys that were blocked by glacial drift or rock divides. In these temporary glacial lakes, as typified by the nearly level area in the east-central part of the county east and south of Montgomery, sands and silts were first deposited by relatively fast moving melt water. Then as the ice further receded, the water backed in slowly, and only the finer material of clay and silt size was carried into these lakes to settle out. Examples of soils that form in glacial lake deposits are Bartle and Peoga soils.

Outwash and lacustrine soils in the valley of the White River formed in material deposited by glacial drift of Wisconsin age. This material was carried down the existing valley by melt water.

At some time after the Illinoian glacial age, loess was deposited over the entire area. This mantle of loess, which generally ranged from a few inches to 25 feet in thickness, contributed much toward development of the profiles of soils in the county. Most of the silt was washed away in the steeper areas, but in nearly level to moderately sloping areas, it remained and is a part of the soil profiles.

The identification of many buried profiles at the point of contact between the mantle of silt and glacial drift indicates that a considerable amount of time elapsed after the Illinoian glacial period before the silt was deposited to any extent. Examples of soils that formed in more than 5 feet of loess are Alford and Hosmer soils. Examples of soils that formed in loess over glacial till are Cincinnati and Vigo soils.

A coarser textured material of sand and silt was carried by wind out of the valley of the White River and deposited on the adjacent uplands. This material is of Wisconsin glacial age and was first deposited in the valley by glacial melt water. It generally ranges from a few feet to 20 feet in thickness. The Princeton and Bloomfield soils formed in this material.

The northeasern and southeastern parts of the county were not affected by glaciation. In these areas the soils formed in residuum from sandstone and shale. Most of these soils have a thin mantle of loess. Examples of soils that formed mainly in residuum from sandstone and shale are Zanesville and Wellston soils.

Climate

The climate of Daviess County is midcontinental and is characterized by a wide range in temperature. The average daily maximum temperature is 89° F. in July, and the average daily minimum temperature is 26° F. in January. Generally, the weather is excessively hot in midsummer.

Rainfall is moderately heavy and averages 42.8 inches annually. It is well distributed throughout the year but is slightly greater in spring and summer than in fall and winter. The large amount of rainfall has leached plant nutrients from the surface layer and has prevented the accumulation of calcium carbonate.

The climate is so nearly uniform throughout the county that differences among the soils cannot be explained on the basis of differences in climate alone. Climatic forces act upon rocks to form the parent materials in which soils are formed, but many of the more important soil characteristics would not develop except for the activity of plant and animal life. Without the changes brought about by the presence of plants and animals, the soils would consist merely of residual or transported materials derived from weathered rock, though some might have definite layers formed by additions of alluvial or colluvial material by differential weathering or leaching.

Climate, acting alone on the parent material, would be largely destructive. It would cause the soluble materials to be washed out of the soils. When combined with the activities of plants and animals, the processes of climate become constructive. A reversible cycle is established between intake and outgo of plant nutrients. Plants draw nutrients from the lower part of the soil; then, when the plants die, the plant nutrients are returned to the upper part of the soil. In Daviess County the climate is such that leaching is greater than replacement, and most of the soils are strongly weathered, leached, acid, and low in fertility.

More information about the climate is given in the section "General Nature of the County."

Plants and animals

Before Daviess County was settled, the native vegetation was most important in the complex of living organisms that affect soil formation. Plants, micro-organisms, earthworms, and other forms of life that live on and in the soil contribute to its morphology. Micro-organisms, such as bacteria and fungi, cause raw plant waste to decompose into organic matter and to be incorporated into the soil. The higher forms of plants return organic matter to the soil and bring moisture and plant nutrients from the lower part of the profile to the upper part.

The native vegetation in this county is largely hardwood trees. Common species are tulip-poplar, oak, hickory, elm, maple, and ash. Only a small amount of organic matter derived from wooded areas was incorporated in the soils while they were forming. In wooded areas of uplands that have never been cleared, thin layers of forest litter and leaf mold cover the soil, and a small amount of organic matter from decayed leaves and twigs is mixed throughout the topmost 1 or 2 inches of the surface layer. Examples of soils that formed mainly under hardwood trees are Cincinnati and Iva soils.

In a small area in the western part of the county, the native vegetation consists of prairie grasses. A large amount of organic matter from these grasses is incorporated in the surface layer. Examples of soils that formed under grass vegetation are Ross and Elston soils.

In other small areas, the native vegetation consists of swamp grasses and sedges and water-tolerant trees. The soils in these areas were covered with water much of the time, and as the organic material fell into the water, it decayed slowly, and some of it accumulated. Lyles and Kings soils formed in these areas.

The vegetation is fairly uniform throughout the county, and major differences in most soils cannot be explained on the basis of differences in vegetation. Though some comparatively minor variations in the vegetation are associated with different soils, the variations are probably chiefly the result, and not the cause, of the difference in soils.

Relief

The relief of this county ranges from nearly level on bottom lands, terraces, and upland flats to very steep on breaks. Most of the county has been dissected greatly by weathering and by streams. The lowest area in Daviess County is 410 feet above sea level, where the East and West Forks of the White River join. The highest area is 720 feet above sea level and is in the extreme northeastern part of the county.

Variations in relief have influenced the formation of the soils in the county by affecting drainage, runoff, and water erosion.

Differences in relief have radically affected moisture and air conditions within the soil. Profiles of soils developed in the same type of parent material in steep areas are less strongly developed than those in nearly level to sloping areas. This difference in soil development is caused by (1) rapid normal erosion, (2) the reduced percolation of water through the soil material, and (3) lack of water in the soil for the vigorous growth of plants that influence soil formation. The degree of profile development within a given time, on a given parent material, and under the same type of vegetation depends largely on the amount of water that passes through the soil material.

Because of the variations in relief, several different soils have developed from the same kind of parent material. For example, the way in which relief has affected soils that developed in the same kind of parent material is shown by comparing the Alford and the Iva soils. Soils of both series formed in deep loess. The Iva soils are nearly level and are somewhat poorly drained. They are gray and mottled and are slow in permeability. The Alford soils are sloping to steep and are well drained, brown, and moderate in permeability.

Time

Generally, the soil profile is more fully developed where the parent material has remained in place for the longer time. Because of differences in parent material, relief, and climate, some soils mature more slowly than others. For example, soils formed in alluvium, such as Haymond and Stendal soils, are immature because the parent material is young and new material is deposited periodically. Steep soils, such as Berks soils, also are likely to be immature because geological erosion removes the soil material as fast as it tends to accumulate. Also, runoff is greater on steep soils, and less water percolates down through the soil material. A mature soil is one that has well-developed A and B horizons that were produced by the natural processes of soil formation. A young soil has little or no horizon differentiation.

The soils that developed in glacial drift and old lacustrine materials of Illinoian age, such as Cincinnati and Hickory soils that are about 300,000 years old, have well developed profiles and are considered to be mature or nearly so. The materials in which the terrace and lacustrine soils have formed, such as Lyles, Kings, McGary, and Markland soils, came from areas of Wisconsin-age glacial drift deposited 20,000 to 30,000 years ago. The terrace and lacustrine soils are along the White River. These soils are less thoroughly or deeply leached than those formed in the glacial drift of the Illinoian age.

The young soils are on bottom lands where new material is deposited periodically. Sandy windblown material, generally in the uplands adjacent to the White River, was deposited during or after the time of the Wisconsin glacial period. Soils, such as Princeton and Bloomfield soils, that formed in this material are less thoroughly or deeply leached than those developed in glacial drift of Illinoian age. They have an immature profile.

Processes of Soil Formation

Most of the soils in Daviess County have moderate to distinct horizons. A few soils have faint horizons.

The differentiation of horizons in soils of the county is the result of one or more of the soil-forming processes: (1) accumulation of organic matter; (2) leaching of carbonates and salts more soluble than calcium carbonates; (3) translocation of silicate clay minerals; and (4) reduction and transfer of iron.

Some organic matter has accumulated in the surface layer of all soils represented in Daviess County. The quantity is very small in some soils but is fairly large in others. Soils, such as Bloomfield loamy fine sand, have a surface layer that is low in organic-matter content, whereas Ross loam has a thick, dark-colored surface layer that has a high accumulation of organic matter.

Leaching of carbonates and salts has occurred in all soils of the county, but this has had only limited influence on horizon differentiation. The effect has been indirect. The leaching permitted subsequent translocation of silicate clay minerals in some soils. Carbonates and salts have been carried completely out of most well-drained soils. Even in the wettest soils, some leaching is indicated by the absence of carbonates and by an acid reaction. Leaching in wet soils is slow because the movement of water through the soil is slow. Leaching has made little progress in soils

formed in recent sediments, such as the alluvial soils along the White River.

Translocation of silicate clay minerals has contributed to the formation of most of the soils in Daviess County. Alford, Cincinnati, and Princeton soils are examples of soils formed primarily by this soil-forming process. The dark coatings on ped faces and the clay films in former root channels in the B horizon of these soils indicate downward movement of silicate clay minerals from the A horizon. Leaching of carbonates and salts from the upper part of the profile seems to be a necessary prelude to the movement of silicate clays.

The reduction and transfer of iron has occurred in all of the very poorly drained, poorly drained, and somewhat poorly drained soils. It has also occurred to some extent in deeper horizons of moderately well drained soils, such as Iona silt loam. In the naturally wet soils such as McGary and Peoga soils, the reduction and transfer of iron, a process often called gleying, has been of importance in horizon differentiation. The gray colors of the deeper horizons of the wet soils indicate the reduction of iron oxides. This reduction is commonly accompanied by some transfer of the iron, which may be local or general in character. After it has been reduced, iron is removed completely from some horizons and deposited in the lower horizons, or it is moved completely out of the profile. Iron has been segregated within deeper horizons of many of the soils to form yellowish-red, strong-brown, or yellowish-brown mottles or concretions.

Classification of the Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research. Soils are placed in narrow classes for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories, so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and revised later (*4*). The system currently used by the National Cooperative Soil Survey was developed in the early sixties (*3*) and was adopted in 1965 (*6*). It is under continual study.

The current system of classification has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The criteria for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available.

Table 8 shows the classification of each soil series of Daviess County by family, subgroup, and order, according to the current system.

ORDER.—Ten soil orders are recognized. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. The two exceptions, the Entisols and Histosols, occur in many different climates. Each order is named with a word of three or four syllables ending in *sol* (Ult-i-*sol*). Table 8 shows the four soil orders in Daviess County: Inceptisols, Mollisols, Alfisols, and Ultisols.

Inceptisols most often are on young but not recent land surfaces. Their name is derived from the Latin *inceptum*, for beginning.

Mollisols generally formed under grass vegetation. They have a thick, dark-colored surface layer called the mollic epipedon; hence their name is derived from the Latin *mollis* for soft.

Alfisols are soils that have a clay-enriched B horizon that is high in base saturation.

Ultisols are soils that have a clay-enriched B horizon that is low in base saturation.

SUBORDER.—Each order is divided into suborders, primarily on the basis of the characteristics that seem to produce classes that have the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging or soil differences resulting from climate or vegetation.

GREAT GROUP.—Each suborder is divided into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus has accumulated or those that contain a pan that interferes with the growth of roots or movement of water. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), and the like. The great group is not shown separately in table 8, because it is the last word in the name of the subgroup.

SUBGROUP.—Great groups are divided into subgroups, one representing the central (typic) segment of the group and others called intergrades that have properties of the group and also have one or more properties of another group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example is Typic Fragiudalfs (a typical Fragiudalf).

FAMILY.—Families are established within a subgroup primarily on the basis of properties important to the growth of plants or behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for characteristics, such as texture and mineralogy, that are used as family differentiae (see table 8). An example is the fine-silty, mixed, mesic family of Typic Fragiudalfs.

SERIES.—The series is a group of soils that have major horizons that, except for texture of the surface layer, are similar in important characteristics and in arrangement in the profile. They are given the name of a geographic loca-

TABLE 8.—*Soil series classified according to the current system of classification*

Series	Family	Subgroup	Order
Alford	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Armiesburg	Fine-silty, mixed, mesic	Fluventic Hapludolls	Mollisols.
Ayrshire	Fine-loamy, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Bartle	Fine-silty, mixed, mesic	Aeric Fragiaqualfs	Alfisols.
Berks	Loamy-skeletal, mixed, mesic	Typic Dystrochrepts	Inceptisols.
Bloomfield	Coarse-loamy, mixed, mesic	Psammentic Hapludalfs	Alfisols.
Bonnie	Fine-silty, mixed, acid	Fluventic Haplaquepts	Inceptisols.
Cincinnati	Fine-silty, mixed, mesic	Typic Fragiudalfs	Alfisols.
Cuba	Fine-silty, mixed, mesic	Fluventic Dystrochrepts	Inceptisols.
Elston	Coarse-loamy, mixed, mesic	Typic Argiudolls	Mollisols.
Gilpin	Fine-loamy, mixed, mesic	Typic Hapludults	Ultisols.
Haymond	Coarse-silty, mixed, mesic	Dystric Fluventic Eutrochrepts	Inceptisols.
Hickory	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Hosmer	Fine-silty, mixed, mesic	Typic Fragiudalfs	Alfisols.
Iona	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Iva	Fine-silty, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Kings	Fine, montmorillonitic, noncalcareous, mesic	Vertic Haplaquolls	Mollisols.
Lyles	Fine-loamy, mixed, noncalcareous, mesic	Typic Haplaquolls	Mollisols.
Markland	Fine, mixed, mesic	Typic Hapludalfs	Alfisols.
McGary	Fine, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Montgomery	Fine, mixed, noncalcareous, mesic	Typic Haplaquolls	Mollisols.
Negley	Fine-loamy, mixed, mesic	Ultic Hapludalfs	Alfisols.
Nolin	Fine-silty, mixed, mesic	Dystric Fluventic Eutrochrepts	Inceptisols.
Parke	Fine-silty, mixed, mesic	Ultic Hapludalfs	Alfisols.
Peoga	Fine-silty, mixed, mesic	Typic Ochraqualfs	Alfisols.
Petrolia	Fine-silty, mixed, nonacid, mesic	Fluventic Haplaquepts	Inceptisols.
Princeton	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Ragsdale	Fine-silty, mixed, mesic	Typic Argiaquolls	Mollisols.
Reesville	Fine-silty, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Ross	Fine-loamy, mixed, mesic	Cumulic Hapludolls	Mollisols.
Stendal	Fine-silty, mixed, acid, mesic	Aeric Fluventic Haplaquepts	Inceptisols.
Vigo	Fine-silty, mixed, mesic	Typic Glossaqualfs	Alfisols.
Vincennes	Fine-loamy, mixed, acid, mesic	Typic Haplaquepts	Inceptisols.
Wakeland	Coarse-silty, mixed, nonacid, mesic	Aeric Fluventic Haplaquepts	Inceptisols.
Wellston	Fine-silty, mixed, mesic	Ultic Hapludalfs	Alfisols.
Zanesville	Fine-silty, mixed, mesic	Typic Fragiudults	Ultisols.
Zipp	Fine, mixed, nonacid, mesic	Typic Haplaquepts	Inceptisols.

tion near the place where that series was first observed and mapped. An example is the Cincinnati series.

The nomenclature for the classes in each of the four highest categories is for the most part connotative. The formative elements come chiefly from the classical languages, but some are derived from nonsense syllables. Many of the roots are familiar and thus help us to visualize the soil.

The names are distinctive for the classes in each category, so that a name itself indicates the category to which a given class belongs. Moreover, the names are designed so that each subgroup by its name is placed in the great group, suborder, and order with which it is identified. For example, the name Aeric Ochraqualfs indicates a class in the subgroups. Furthermore, from the name, one can identify the great group (Ochraqualfs), the suborder (Aqualis), and the order (Alfisols).

General Nature of the County

The treaty of Fort Wayne, signed on June 7, 1803, opened this part of the Northwest Territory to settlement.

The first settlement was made in 1806, and by 1812, some 50 families were housed in several forts. One of these forts was at what is now the city of Washington. Situated at the two forks of the White River, Daviess County was a pathway of travel by Indians, explorers, and pioneers.

These two rivers had an important influence on the early history of the county and were the main arteries of traffic until they were replaced by railroads in 1857.

In the 10-year period from 1950 to 1960, the population of Daviess County decreased slightly from 26,762 to 26,636.

The major area of industry centers around Washington Township, which contains 54 percent of the population in Daviess County. Three other townships have shown slight increases in population because of their location with respect to employment opportunities. They are Barr, Van Buren, and Madison Townships, and they are within easy driving distance to Crane Naval Ammunition Depot.

Water Supply

Drilled wells are the principal type of water wells used in the county. A small number of driven and dug wells are still in use.

In upland areas sandstone rock is the principal source of ground water and is tapped extensively by domestic, livestock, and a few industrial wells. Well depths range from about 40 to 400 feet. The average depth is generally less than 200 feet. Yields of water from these wells are generally less than 20 gallons per minute, and numerous wells have been abandoned because of insufficient water. On bottom lands and terraces along the White River, wells that yield several hundred gallons per minute can be developed in underlying sand and gravel formations.

These deposits are an important source of water for domestic, industrial, and irrigation supplies. The cities of Washington, Elnora, Plainfield, and Odon receive their water supply from deep wells.

The quality of water from drilled wells varies greatly. In most upland areas the iron content and either the chloride or sulfate content exceed the U.S. Public Health Service (1946) standards for drinking water.

In areas where the yield of water from ground water sources is low or where the chloride and sulfate content is excessive, the water supply must come from lakes and ponds. A large number of farm ponds have been constructed for water supply, fire protection, and wildlife habitat.

An opportunity exists through the watershed program, Public Law 566, to build multi-purpose structures that provide a source of water for domestic, industrial, and recreational uses as well as for flood protection.

Relief and Drainage

Daviess County is almost entirely within the physiographic unit known as the Wabash Lowland, which is bordered on the east by the Crawford Upland. The county is characterized mostly by gently rolling hills and broad flat valleys. Soils in the county are derived mostly from glacial outwash materials, loess, and eolian sand. Only small areas of soils in the eastern part of the county formed in material weathered from the original bedrock.

The elevation of the county ranges from about 700 feet in the northeastern part of the county to about 400 feet at the junction of the East and West Forks of the White River. The average elevation is about 520 feet.

The county is drained by the East and West Forks of the White River and by small streams throughout the county. Prairie Creek, the largest stream, drains the north-central and central parts. Smothers Creek and First Creek drain the northern part, and Veale Creek, Aikman Creek, and Sugar Creek drain the southern part. Little Boggs Creek, Shurm Creek, and How Creek drain the east-central part.

A watershed protection program has been completed on the Prairie Creek Watershed. Works of improvement include 12 floodwater-retaining structures (fig. 14), 49 miles of channel improvement, and 15 miles of levees,

Figure 14.—A floodwater-retarding structure developed on Cincinnati and Wakeland soils. This lake is one of 12 flood control structures on the Prairie Creek Watershed that help to protect valuable cropland, roads, bridges, culverts, and buildings from flood damage on the flood plain along the main channel.

TABLE 9.—*Temperature and precipitation*

[All data from Washington, elevation 520 feet]

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	Average monthly maximum	Average monthly minimum	Average monthly total	One year in 10 will have— Less than—	One year in 10 will have— More than—	Days with snow cover of 1 inch or more	Average depth of snow on days with snow cover of 1 inch or more
	°F.	*°F.*	*°F.*	*°F.*	*Inches*	*Inches*	*Inches*	*Number*	*Inches*
January	42	26	62	2	3. 9	1. 2	9. 1	4	2
February	45	27	66	6	2. 7	. 8	5. 2	2	3
March	54	34	76	16	3. 9	1. 2	7. 7	1	2
April	67	45	84	29	4. 2	1. 3	6. 9	([1])	2
May	76	54	89	38	4. 2	2. 0	6. 9	0	0
June	85	64	94	50	4. 8	1. 8	7. 1	0	0
July	89	67	97	56	3. 7	1. 5	8. 4	0	0
August	88	66	96	53	3. 1	. 7	5. 3	0	0
September	82	58	95	41	3. 3	. 7	5. 7	0	0
October	71	48	86	31	2. 6	. 7	4. 7	0	0
November	54	36	75	17	3. 4	. 9	5. 4	1	2
December	44	28	64	6	3. 0	1. 2	5. 1	2	2
Year	66	46	[2] 99	[3] 2	42. 8	30. 7	55. 4	10	2

[1] Less than one-half day.
[2] Average annual maximum.
[3] Average annual minimum.

along with land treatment measures such as terraces, waterways, crop rotation, tree plantings, and wildlife habitat management. This project has substantially reduced flooding on about 5,000 acres of the flood plain and has provided for one multi-purpose structure for recreation and flood control near Montgomery. The project not only reduces flooding and erosion damage, but provides recreation and has increased the overall economy of Daviess County.

Climate [4]

Daviess County has an invigorating climate and four well-defined seasons of the year. Air of both tropical and polar origin brings frequent changes in temperature and humidity. The average annual rainfall is 42.8 inches, an amount that is ample and, in most years, is well distributed for the crops commonly grown in the county. Precipitation is generally greatest late in spring and early in summer. The winter months receive an average of about 3 inches and the spring months a little over 4 inches per month. April and May each has an average of 8 days on which there is 0.10 inch or more of rain. The number of days per month having 0.10 inch or more of precipitation is only 5 late in summer and early in fall.

Thunderstorms are the primary source of rainfall in summer. The intensity of rainfall during these storms is commonly great enough to cause severe erosion on sloping soils that are not properly protected. Occasionally there are periods up to 3 weeks long in summer and early in fall during which there is little or no rainfall. This situation can result in damage to crops and significantly lower yields, for crops grown on soils that have a low or moderate available moisture capacity.

Relative humidity on a typical summer day ranges from the 40's in the afternoon to 90 percent or higher just before dawn. Relative humidity rises and falls much as temperature does during a 24-hour period, but the highest humidity generally occurs with the minimum temperature and the lowest with the maximum temperature. In the winter the most probable range of relative humidity is from the 60's to the 90's. Southerly winds bring a higher humidity than northerly winds.

Prevailing winds are from the southwest most of the year, but they are westerly and northwesterly in winter. At a height of 20 feet above the ground, the average wind velocity is about 10 miles per hour in spring and near 7 miles per hour late in summer. Winds are stronger during daylight hours than at night.

The average growing season is about 190 days, based on a minimum temperature of 32° F., or about 210 days, based on a minimum temperature of 28°. It is satisfactory for the crops commonly grown in the county.

The most nearly ideal weather for outdoor activities is in fall, when temperatures are most regularly in the comfortable range, showers are more infrequent, and the percent of sunshine, compared to the maximum possible, averages about 72 percent.

Data on temperature and precipitation are given in table 9. The probabilities of the last freezing temperatures in spring and the first in fall are given in table 10.

[4] By LAWRENCE A. SCHAAL, climatologist for Indiana, National Weather Service, U.S. Department of Commerce.

TABLE 10.—*Probabilities of last freezing temperatures in spring and first in fall*

[All data from Washington, elevation 520 feet]

Probability	Dates for given probability and temperature				
	16° F. or lower	20° F. or lower	24° F. or lower	28° F. or lower	32° F. or lower
Spring:					
1 year in 10 later than	March 20	March 28	April 5	April 17	April 28
2 years in 10 later than	March 14	March 25	April 1	April 14	April 24
5 years in 10 later than	February 27	March 8	March 21	April 2	April 13
Fall:					
1 year in 10 earlier than	November 17	November 14	October 26	October 21	October 7
2 years in 10 earlier than	November 26	November 21	November 3	October 27	October 14
5 years in 10 earlier than	December 8	November 30	November 12	November 3	October 24

Industries, Transportation, and Markets

In addition to the farming, mining, and oil industries, there are other important industries in the county. Washington has seven industries, Odon has one, and nearby Crane Naval Ammunition Depot provides employment for a large number of employees.

Three railroads and three Federal highways pass through the county. U.S. Highway No. 150A and U.S. Highway No. 50 pass from east to west, and U.S. Highway No. 231 passes from north to south. State Routes 57, 58, and 257 bisect the county. Markets for livestock are within a reasonable distance. The larger markets within a 100-mile radius are at Louisville, Evansville, and Indianapolis. Smaller markets are at Wheatland, Linton, and Vincennes. Grain elevators, along with truck and rail transportation, provide adequate handling of grain at harvest time.

Farming

The farming in Daviess County is based mostly on grain farming and the raising of livestock, chiefly hogs and cattle.

Corn and soybeans are the main crops, and wheat is next in importance. Meadow crops provide pasture for livestock. Most pastures are a mixture of Ladino clover, red clover, lespedeza, and grass. In recent years fescue pastures have been highly successful.

Between 1950 and 1964 the number of farms decreased from 2,184 to 1,526, a decrease of 658 farms in 14 years. The average size of farms increased from 110.3 acres in 1950 to 154.6 acres in 1964.

Full owners of farms have decreased in number from 1,442 in 1950 to 886 in 1964. In contrast, the number of part owners increased from 446 in 1950 to 1,066 in 1964, and the number of managers increased from one to two.

In 1964, 63 percent of the farm income came from livestock and livestock products. The number of cattle has remained steady for the last few years, but the number of hogs has fluctuated but increased considerably since 1959.

Vegetable and melon crops are grown mostly on sandy soils in the western part of the county. They are grown commercially as well as for farm roadside markets.

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Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Claypan. A compact, slowly permeable soil horizon that contains more clay than the horizon above and below it. A claypan is commonly hard when dry and plastic or stiff when wet.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some con-

cretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A horizon and the upper part of the B horizon and have mottling in the lower part of the B horizon and the C horizon.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Drift (geology). Material of any sort deposited by geologic processes in one place after having been removed from another; includes drift materials deposited by glaciers and by streams and lakes associated with them.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Glacial till (geology). Unassorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residue.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A horizon to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that in which the overlying horizons formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock generally underlies a C horizon but may be immediately beneath an A or B horizon.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils generally indicates poor aeration and lack of drainage. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

pH value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline.	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Slope. Expressed in percent of slope, which equals the number of feet of change in elevation per 100 feet of horizontal distance.

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Moderately sloping	6 to 12 percent
Strongly sloping	12 to 18 percent
Moderately steep	18 to 25 percent
Steep	25 to 35 percent
Very steep	35 percent or more

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles, less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 milimeter); and *clay* (less than 0.002 millimeter). The separates recognized by the International Society of Soil Science are as follows: I (2.0 to 0.2 millimeter); II (0.2 to 0.02 millimeter); III (0.02 to 0.002 millimeter); IV (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

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GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. In referring to a capability unit, read the introduction to the section it is in for general information about its management. For information on use of the soils for woodland, see the section "Woodland," page 47. Other information is given in tables as follows:

Acreage and extent, table 1, page 12.
Predicted yields, table 2, page 49.
Limitations for recreation, table 5, page 57.
Engineering uses of the soils, tables 6 and 7, pages 62 through 75.

Map symbol	Mapping unit	Described on page	Capability unit		Woodland suitability group
			Symbol	Page	Symbol
AlB2	Alford silt loam, 2 to 6 percent slopes, eroded	13	IIe-3	41	1o1
AlB3	Alford silt loam, 2 to 6 percent slopes, severely eroded	13	IIIe-3	43	1o1
AlC2	Alford silt loam, 6 to 12 percent slopes, eroded	13	IIIe-3	43	1o1
AlC3	Alford silt loam, 6 to 12 percent slopes, severely eroded	13	IVe-3	46	1o1
AlD2	Alford silt loam, 12 to 18 percent slopes, eroded	13	IVe-3	46	1o1
AlD3	Alford silt loam, 12 to 18 percent slopes, severely eroded	13	VIe-1	47	1o1
AlE2	Alford silt loam, 18 to 25 percent slopes, eroded	14	VIe-1	47	1r2
AlE3	Alford silt loam, 18 to 25 percent slopes, severely eroded	14	VIe-1	47	1r2
Ar	Armiesburg silty clay loam	14	I-2	41	o23
Ay	Ayrshire fine sandy loam	15	IIIw-4	44	3w5
Ba	Bartle silt loam	15	IIIw-3	44	3w5
BlB	Bloomfield loamy fine sand, 2 to 6 percent slopes	16	IIIs-1	45	2s15
BlC	Bloomfield loamy fine sand, 6 to 12 percent slopes	17	IIIe-12	43	2s15
BlD	Bloomfield loamy fine sand, 12 to 18 percent slopes	17	IVe-12	46	2s15
BlF	Bloomfield loamy fine sand, 18 to 35 percent slopes	17	VIe-3	47	2s15
Bo	Bonnie silt loam	17	IIIw-10	45	2w11
CcB2	Cincinnati silt loam, 2 to 6 percent slopes, eroded	18	IIe-7	41	3d9
CcC2	Cincinnati silt loam, 6 to 12 percent slopes, eroded	18	IIIe-7	43	3d9
CcC3	Cincinnati silt loam, 6 to 12 percent slopes, severely eroded	18	IVe-7	46	3d9
CcD2	Cincinnati silt loam, 12 to 18 percent slopes, eroded	18	IVe-7	46	3d9
CcD3	Cincinnati silt loam, 12 to 18 percent slopes, severely eroded	19	VIe-1	47	3d9
Cu	Cuba silt loam	19	I-2	41	1o8
En	Elston loam	20	IIs-2	42	o23
GbF	Gilpin-Berks complex, 25 to 50 percent slopes	20	VIIe-1	47	3o10
Hd	Haymond silt loam	21	I-2	41	1o8
HkE2	Hickory silt loam, 18 to 25 percent slopes, eroded	21	VIe-1	47	1r2
HkF	Hickory silt loam, 25 to 50 percent slopes	21	VIIe-1	47	1r2
HoA	Hosmer silt loam, 0 to 2 percent slopes	22	IIw-5	42	3d9
HoB2	Hosmer silt loam, 2 to 6 percent slopes, eroded	22	IIe-7	41	3d9
HoB3	Hosmer silt loam, 2 to 6 percent slopes, severely eroded	23	IIIe-7	43	3d9
HoC2	Hosmer silt loam, 6 to 12 percent slopes, eroded	23	IIIe-7	43	3d9
HoC3	Hosmer silt loam, 6 to 12 percent slopes, severely eroded	23	IVe-7	46	3d9
HoD2	Hosmer silt loam, 12 to 18 percent slopes, eroded	23	IVe-7	46	3d9
HoD3	Hosmer silt loam, 12 to 18 percent slopes, severely eroded	23	VIe-1	47	3d9
IoA	Iona silt loam, 0 to 2 percent slopes	24	I-1	40	1o1
IoB2	Iona silt loam, 2 to 6 percent slopes, eroded	24	IIe-3	41	1o1
IvA	Iva silt loam, 0 to 2 percent slopes	25	IIw-2	42	3w5
IvB2	Iva silt loam, 2 to 4 percent slopes, eroded	25	IIe-12	41	3w5

Map symbol	Mapping unit	Described on page	Capability unit		Woodland suitability group
			Symbol	Page	Symbol
Kn	Kings silty clay	26	IIIw-2	44	2w11
Ls	Lyles fine sandy loam	26	IIw-1	42	2w11
Ly	Lyles loam	26	IIw-1	42	2w11
MaB2	Markland silt loam, 2 to 6 percent slopes, eroded	27	IIIe-11	43	3r18
MaD2	Markland silt loam, 6 to 18 percent slopes, eroded	27	IVe-11	46	3r18
Mg	McGary silt loam	27	IIIw-6	44	3w5
Mo	Montgomery silty clay loam	28	IIIw-2	44	2w11
NeF	Negley loam, 25 to 50 percent slopes	29	VIIe-1	47	1r2
No	Nolin silty clay loam	29	I-2	41	1o8
PaB2	Parke silt loam, 2 to 6 percent slopes, eroded	29	IIe-1	41	1o1
PaC2	Parke silt loam, 6 to 12 percent slopes, eroded	30	IIIe-1	43	1o1
PaC3	Parke silt loam, 6 to 12 percent slopes, severely eroded	30	IVe-1	45	1o1
PaD2	Parke silt loam, 12 to 18 percent slopes, eroded	30	IVe-1	45	1o1
Pe	Peoga silt loam	30	IIIw-12	45	2w11
Po	Petrolia silty clay loam	31	IIw-7	42	2w13
PrA	Princeton fine sandy loam, 0 to 2 percent slopes	32	IIs-5	43	1r2
PrB2	Princeton fine sandy loam, 2 to 6 percent slopes, eroded	32	IIe-11	41	1r2
PrC2	Princeton fine sandy loam, 6 to 12 percent slopes, eroded	32	IIIe-15	44	1r2
PrD2	Princeton fine sandy loam, 12 to 18 percent slopes, eroded	32	IVe-15	46	1r2
Ra	Ragsdale silt loam	33	IIw-1	42	2w11
Re	Reesville silt loam	34	IIw-2	42	3w5
Ro	Ross loam	34	I-2	41	o23
Sr	Stendal silt loam	34	IIw-7	42	2w13
St	Strip mines	35	VIIe-3	47	4r16
Vg	Vigo silt loam	35	IIIw-3	44	3w5
Vn	Vincennes clay loam	36	IIw-1	42	2w11
Wa	Wakeland silt loam	36	IIw-7	42	2w13
WeD2	Wellston silt loam, 12 to 18 percent slopes, eroded	37	IVe-3	46	3o10
WeD3	Wellston silt loam, 12 to 18 percent slopes, severely eroded	37	VIe-1	47	3o10
WeE	Wellston silt loam, 18 to 25 percent slopes	37	VIe-1	47	3o10
WeF	Wellston silt loam, 25 to 35 percent slopes	37	VIe-1	47	3o10
ZaB2	Zanesville silt loam, 2 to 6 percent slopes, eroded	38	IIe-7	41	3d9
ZaC2	Zanesville silt loam, 6 to 12 percent slopes, eroded	38	IIIe-7	43	3d9
ZaC3	Zanesville silt loam, 6 to 12 percent slopes, severely eroded	38	IVe-7	46	3d9
ZaD2	Zanesville silt loam, 12 to 18 percent slopes, eroded	38	IVe-7	46	3d9
ZaD3	Zanesville silt loam, 12 to 18 percent slopes, severely eroded	39	VIe-1	47	3d9
Zp	Zipp silty clay loam	39	IIIw-2	44	2w11
Zs	Zipp silty clay loam, overwash	39	IIIw-2	44	2w11

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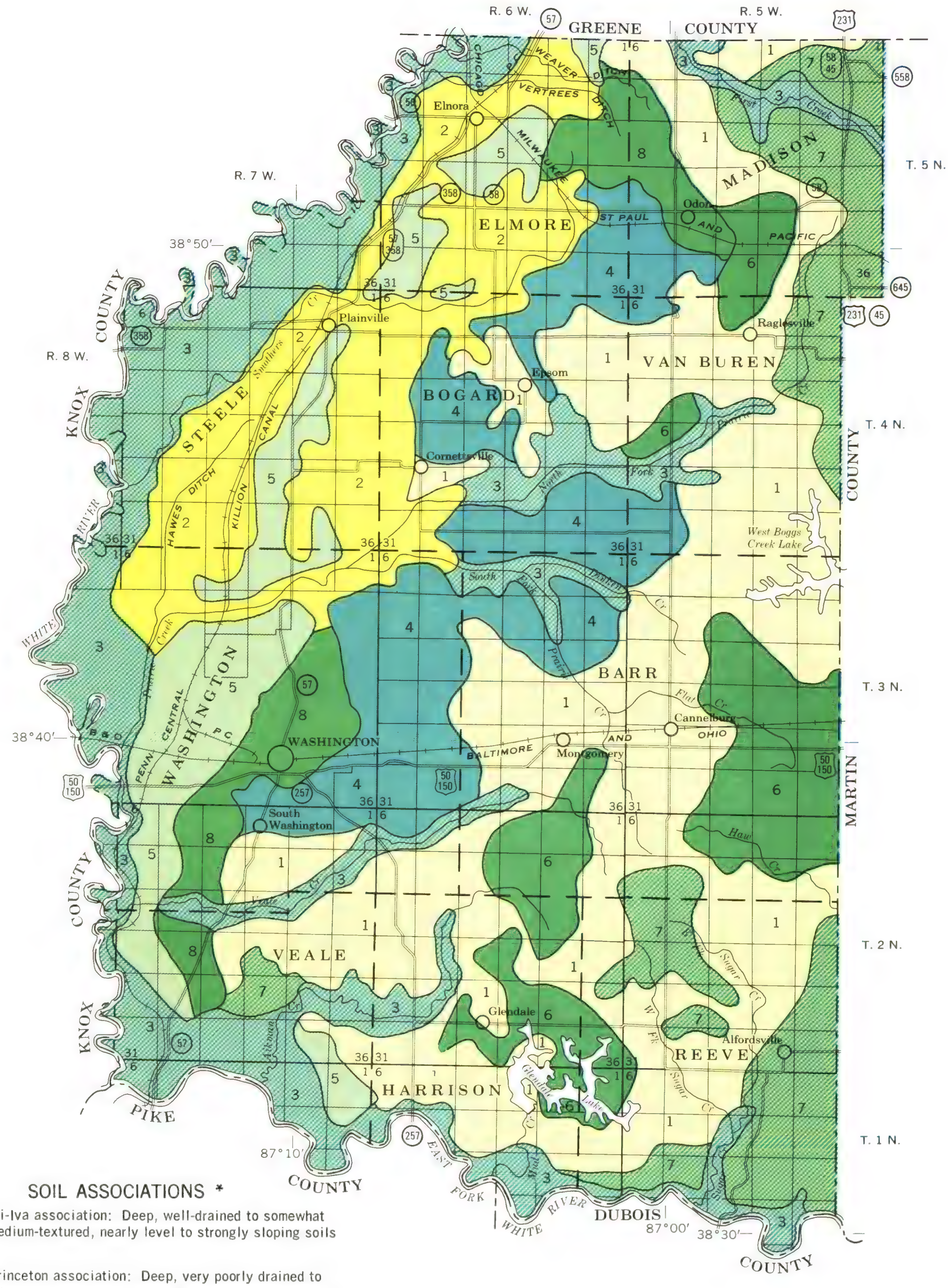


SOIL ASSOCIATIONS *

1 — Hosmer-Cincinnati-Iva association: Deep, well-drained to somewhat poorly drained, medium-textured, nearly level to strongly sloping soils on uplands

2 — Lyles-Ayrshire-Princeton association: Deep, very poorly drained to well-drained, medium-textured and moderately coarse textured, nearly level to strongly sloping soils on uplands and terraces

3 — Haymond-Nolin-Petrolia association: Deep, well-drained to poorly drained, medium-textured and moderately fine textured, nearly level soils on bottom lands

4 — Ragsdale-Iva-Reesville association: Deep, very poorly drained and somewhat poorly drained, medium-textured, nearly level and gently sloping soils on uplands

5 — Bloomfield-Princeton-Ayrshire association: Deep, somewhat excessively drained to somewhat poorly drained, coarse textured and moderately coarse textured, nearly level to steep soils on uplands

6 — Peoga-Bartle-Hosmer association: Deep, poorly drained to well-drained, medium-textured, nearly level to strongly sloping soils on old lakebeds

7 — Zanesville-Wellston association: Deep, well-drained, medium-textured, gently sloping to steep soils on uplands

8 — Alford association: Deep, well-drained, medium-textured, gently sloping to moderately steep soils on uplands

* Terms for texture in the names of the associations refer to the surface layer of the major soils unless stated otherwise.

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

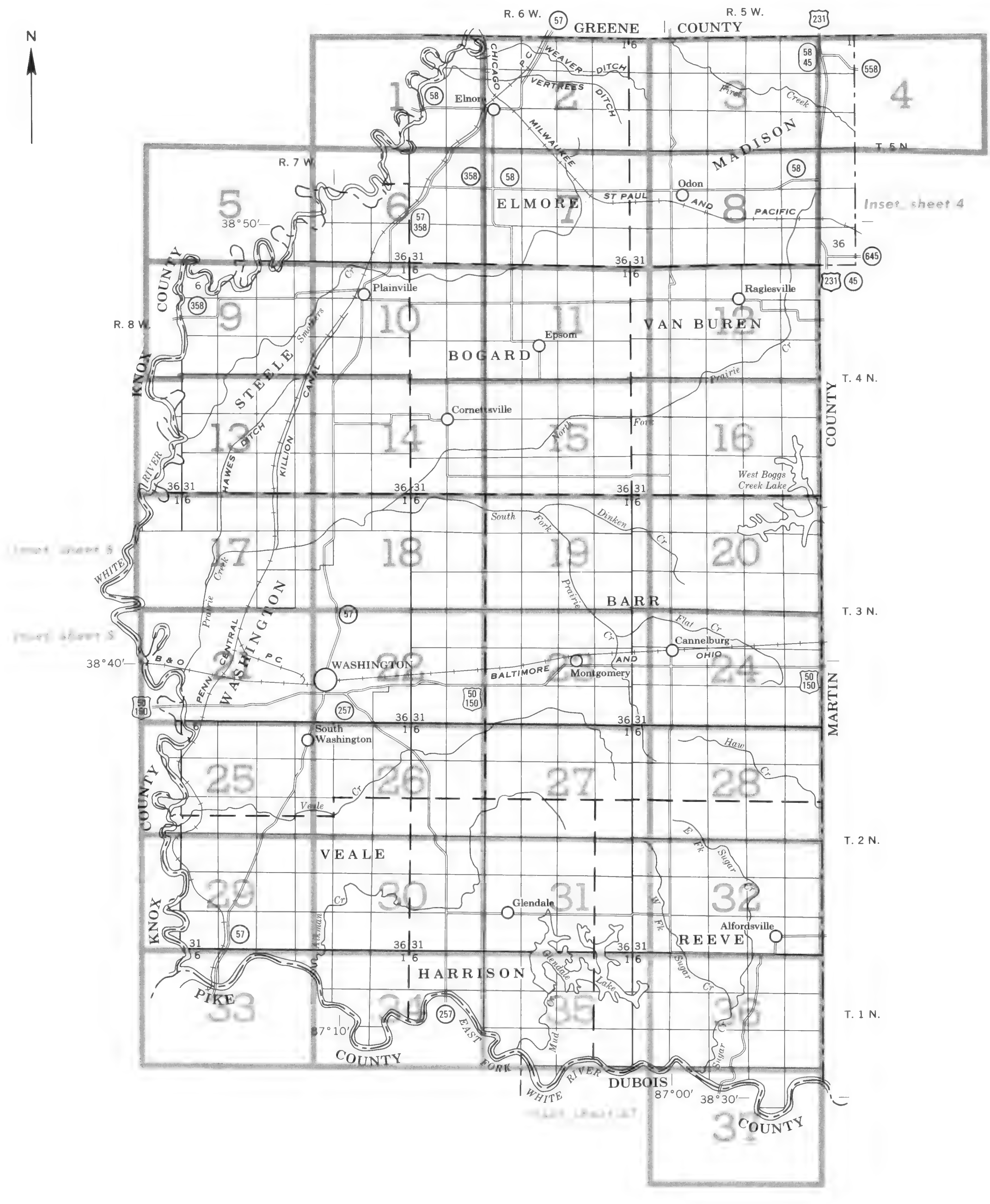
Compiled 1973

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
DAVIESS COUNTY, INDIANA

Scale 1:190,080
1 0 1 2 3 4 Miles

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS
DAVIESS COUNTY, INDIANA

Scale 1:190,080

1 0 1 2 3 4 Miles

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

SOIL LEGEND

The first capital letter is the initial one of the soil name. The second capital letter, A, B, C, D, E, or F, shows the slope. Symbols without a slope letter are those of nearly level soils. The number, 2 or 3, in the symbol indicates that the soil is eroded or severely eroded.

SYMBOL	NAME
AlB2	Alford silt loam, 2 to 6 percent slopes, eroded
AlB3	Alford silt loam, 2 to 6 percent slopes, severely eroded
AlC2	Alford silt loam, 6 to 12 percent slopes, eroded
AlC3	Alford silt loam, 6 to 12 percent slopes, severely eroded
AlD2	Alford silt loam, 12 to 18 percent slopes, eroded
AlD3	Alford silt loam, 12 to 18 percent slopes, severely eroded
AlE2	Alford silt loam, 18 to 25 percent slopes, eroded
AlE3	Alford silt loam, 18 to 25 percent slopes, severely eroded
Ar	Armiesburg silty clay loam
Ay	Ayrshire fine sandy loam
Ba	Bartle silt loam
BlB	Bloomfield loamy fine sand, 2 to 6 percent slopes
BlC	Bloomfield loamy fine sand, 6 to 12 percent slopes
BlD	Bloomfield loamy fine sand, 12 to 18 percent slopes
BlF	Bloomfield loamy fine sand, 18 to 35 percent slopes
Bo	Bonnie silt loam
CcB2	Cincinnati silt loam, 2 to 6 percent slopes, eroded
CcC2	Cincinnati silt loam, 6 to 12 percent slopes, eroded
CcC3	Cincinnati silt loam, 6 to 12 percent slopes, severely eroded
CcD2	Cincinnati silt loam, 12 to 18 percent slopes, eroded
CcD3	Cincinnati silt loam, 12 to 18 percent slopes, severely eroded
Cu	Cuba silt loam
En	Elston loam
GbF	Gilpin-Berks complex, 25 to 50 percent slopes
Hd	Haymond silt loam
HkE2	Hickory silt loam, 18 to 25 percent slopes, eroded
HkF	Hickory silt loam, 25 to 50 percent slopes
HoA	Hosmer silt loam, 0 to 2 percent slopes
HoB2	Hosmer silt loam, 2 to 6 percent slopes, eroded
HoB3	Hosmer silt loam, 2 to 6 percent slopes, severely eroded
HoC2	Hosmer silt loam, 6 to 12 percent slopes, eroded
HoC3	Hosmer silt loam, 6 to 12 percent slopes, severely eroded
HoD2	Hosmer silt loam, 12 to 18 percent slopes, eroded
HoD3	Hosmer silt loam, 12 to 18 percent slopes, severely eroded
IoA	Iona silt loam, 0 to 2 percent slopes
IoB2	Iona silt loam, 2 to 6 percent slopes, eroded
IvA	Iva silt loam, 0 to 2 percent slopes
IvB2	Iva silt loam, 2 to 4 percent slopes, eroded
Kn	Kings silty clay
Ls	Lyles fine sandy loam
Ly	Lyles loam
MaB2	Markland silt loam, 2 to 6 percent slopes, eroded
MaD2	Markland silt loam, 6 to 18 percent slopes, eroded
Mg	McGary silt loam
Mo	Montgomery silty clay loam
NeF	Negley loam, 25 to 50 percent slopes
No	Nolin silty clay loam
PaB2	Parke silt loam, 2 to 6 percent slopes, eroded
PaC2	Parke silt loam, 6 to 12 percent slopes, eroded
PaC3	Parke silt loam, 6 to 12 percent slopes, severely eroded
PaD2	Parke silt loam, 12 to 18 percent slopes, eroded
Pe	Peoga silt loam
Po	Petrolia silty clay loam
PrA	Princeton fine sandy loam, 0 to 2 percent slopes
PrB2	Princeton fine sandy loam, 2 to 6 percent slopes, eroded
PrC2	Princeton fine sandy loam, 6 to 12 percent slopes, eroded
PrD2	Princeton fine sandy loam, 12 to 18 percent slopes, eroded
Ra	Ragsdale silt loam
Re	Reesville silt loam
Ro	Ross loam
Sr	Stendal silt loam
St	Strip mines
Vg	Vigo silt loam
Vn	Vincennes clay loam
Wa	Wakeland silt loam
WeD2	Wellston silt loam, 12 to 18 percent slopes, eroded
WeD3	Wellston silt loam, 12 to 18 percent slopes, severely eroded
WeE	Wellston silt loam, 18 to 25 percent slopes
WeF	Wellston silt loam, 25 to 35 percent slopes
ZaB2	Zanesville silt loam, 2 to 6 percent slopes, eroded
ZaC2	Zanesville silt loam, 6 to 12 percent slopes, eroded
ZaC3	Zanesville silt loam, 6 to 12 percent slopes, severely eroded
ZaD2	Zanesville silt loam, 12 to 18 percent slopes, eroded
ZaD3	Zanesville silt loam, 12 to 18 percent slopes, severely eroded
Zp	Zipp silty clay loam
Zs	Zipp silty clay loam, overwash

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Divided
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under

Buildings
- School
- Church

Mine and quarry

Gravel pit

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

Forest fire or lookout station

Windmill

Located object

BOUNDARIES

National or state

County

Minor civil division

Reservation

Land grant

Small park, cemetery, airport

Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
- Unclassified

Canals and ditches

Lakes and ponds
- Perennial (water, w)
- Intermittent (int)

Spring

Marsh or swamp

Wet spot

Drainage end or alluvial fan

RELIEF

Escarpments
- Bedrock
- Other

Short steep slope

Prominent peak

Depressions (Large, Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

Soil boundary and symbol (Dx)

Gravel

Stoniness
- Stony
- Very stony

Rock outcrops

Chert fragments

Clay spot

Sand spot

Gumbo or scabby spot

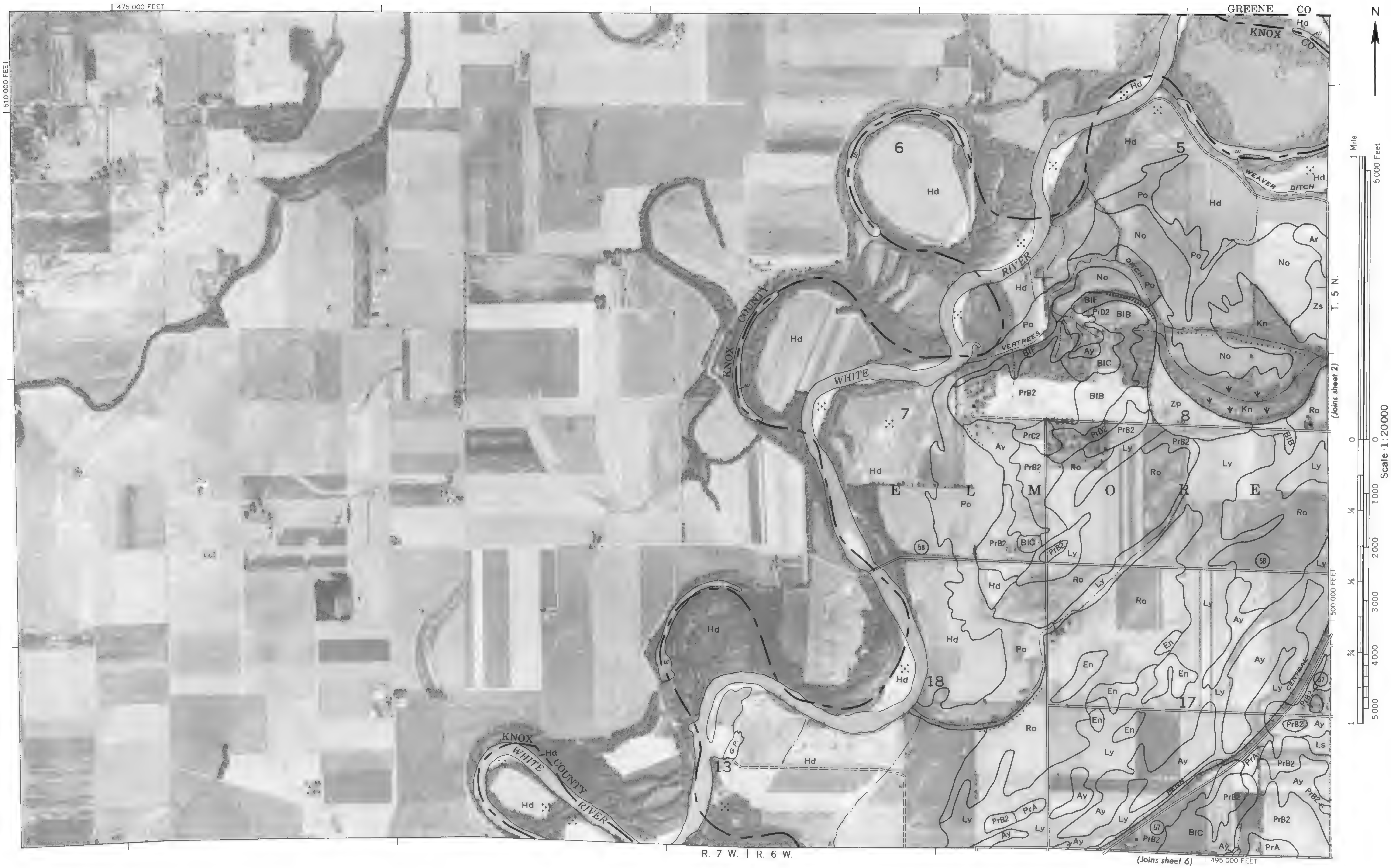
Made land

Severely eroded spot

Blowout, wind erosion

Gully

1



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DAVIESS COUNTY, INDIANA NO. 1

DAVIESS COUNTY, INDIANA — SHEET NUMBER 2

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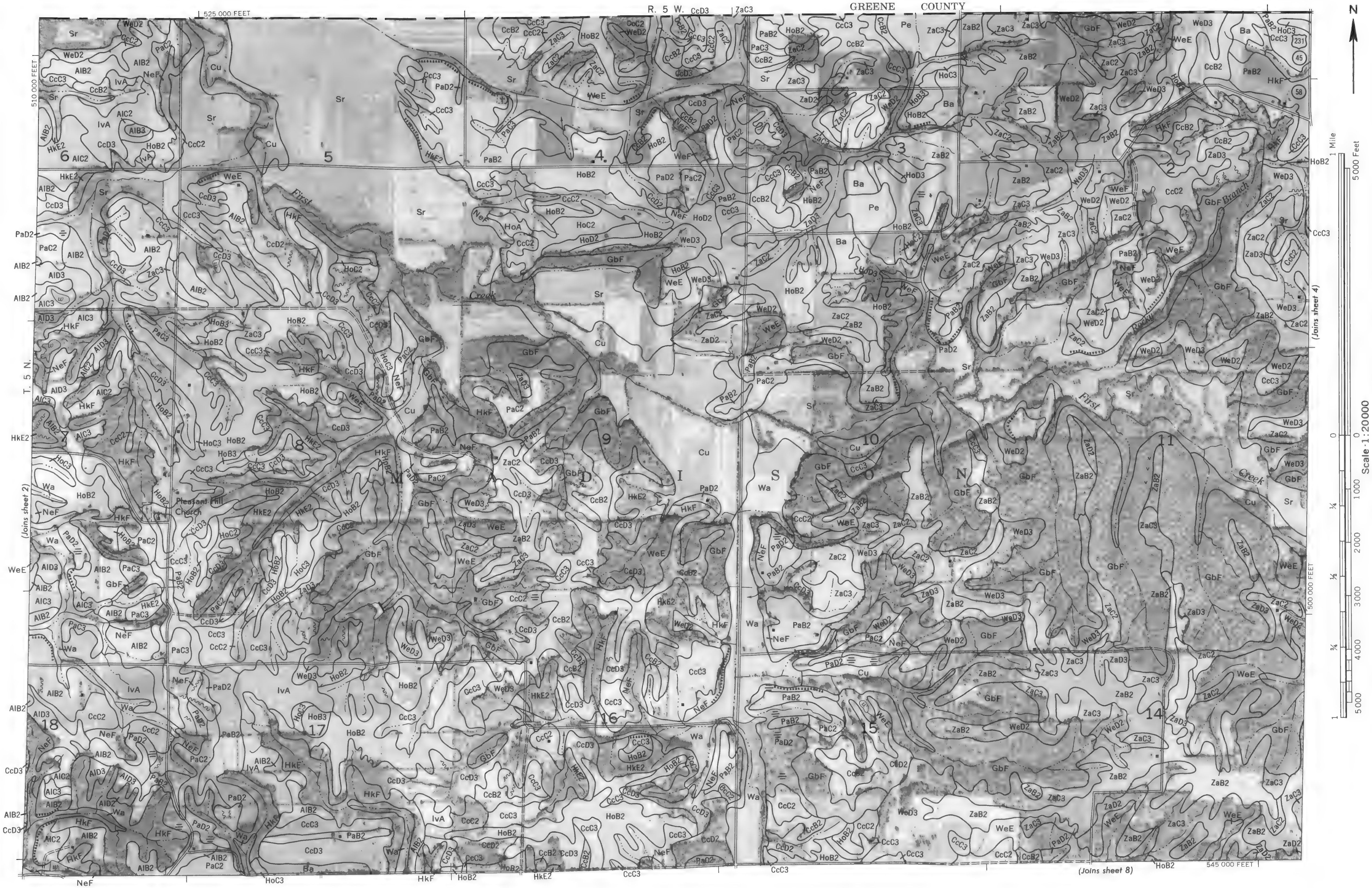
DAVIESS COUNTY, INDIANA NO. 2



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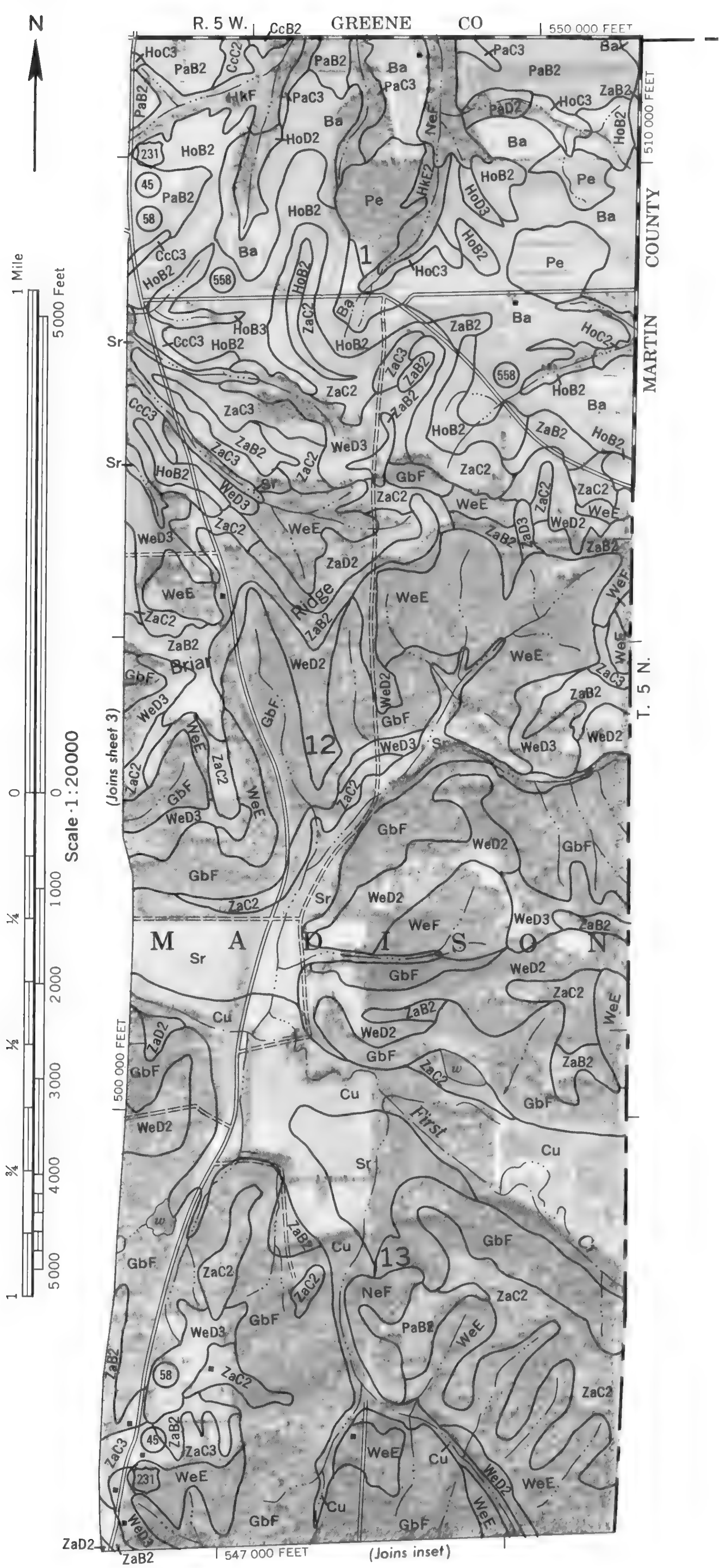
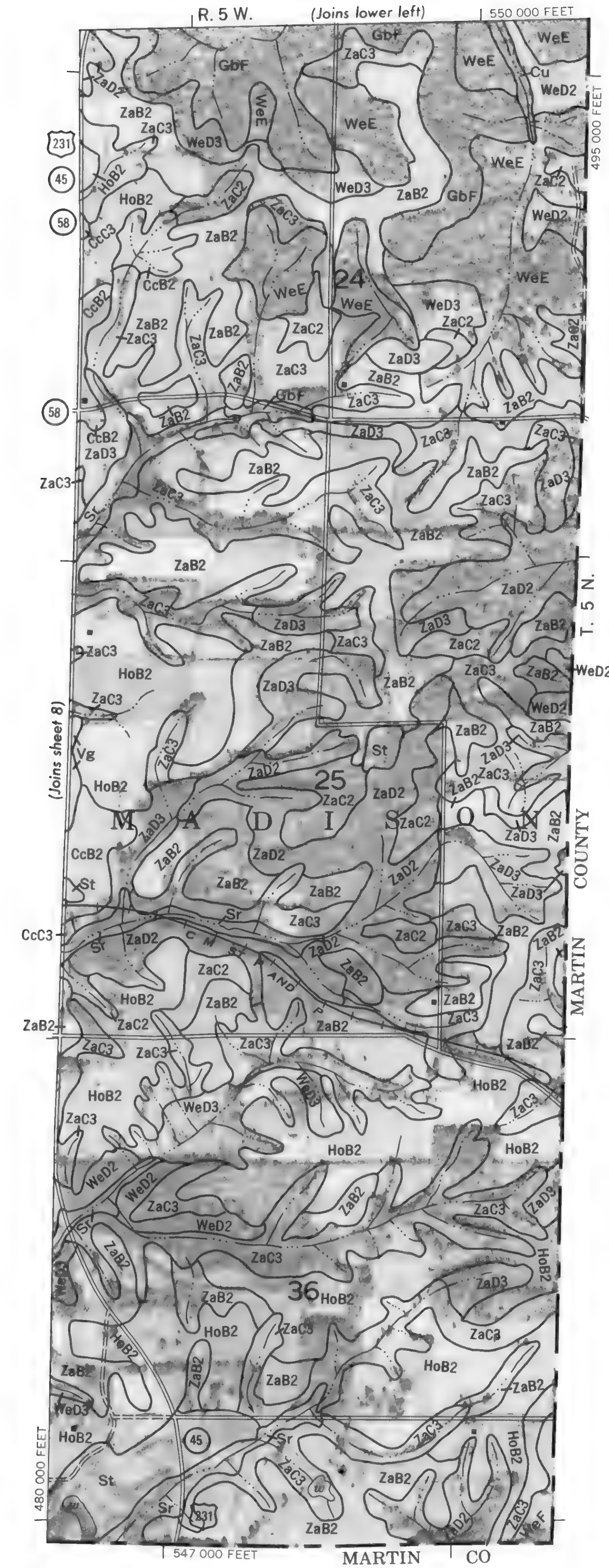
DAVIESS COUNTY, INDIANA NO. 3

DAVIESS COUNTY, INDIANA — SHEET NUMBER 4



3000 AND 5000-FOOT GRID TICKS



3000 AND 5000-FOOT GRID TICKS

DAVIESS COUNTY, INDIANA NO. 4

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DAVIESS COUNTY, INDIANA NO. 5

DAVIESS COUNTY, INDIANA — SHEET NUMBER 6

DAVIESS COUNTY, INDIANA NO. 6

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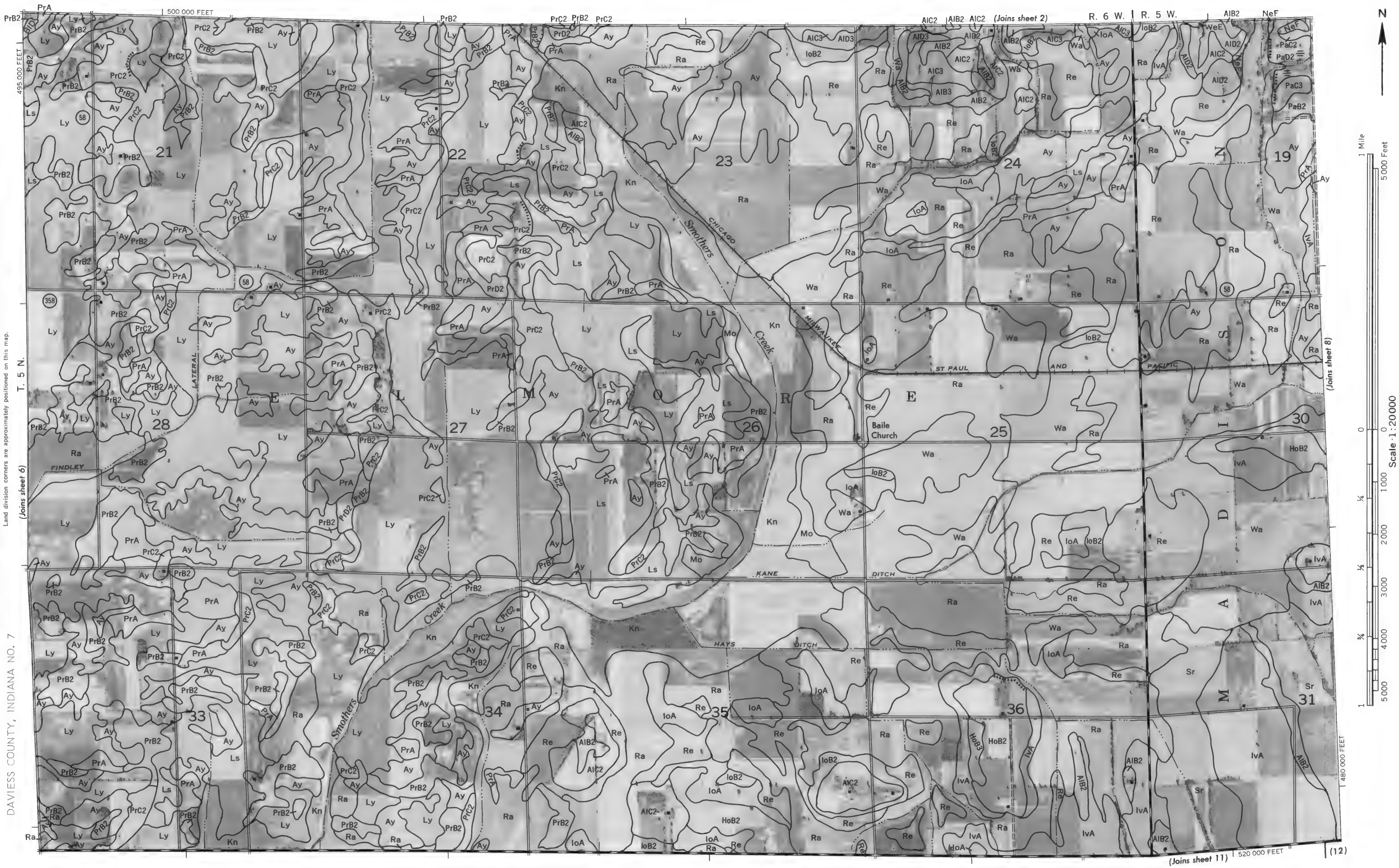
7



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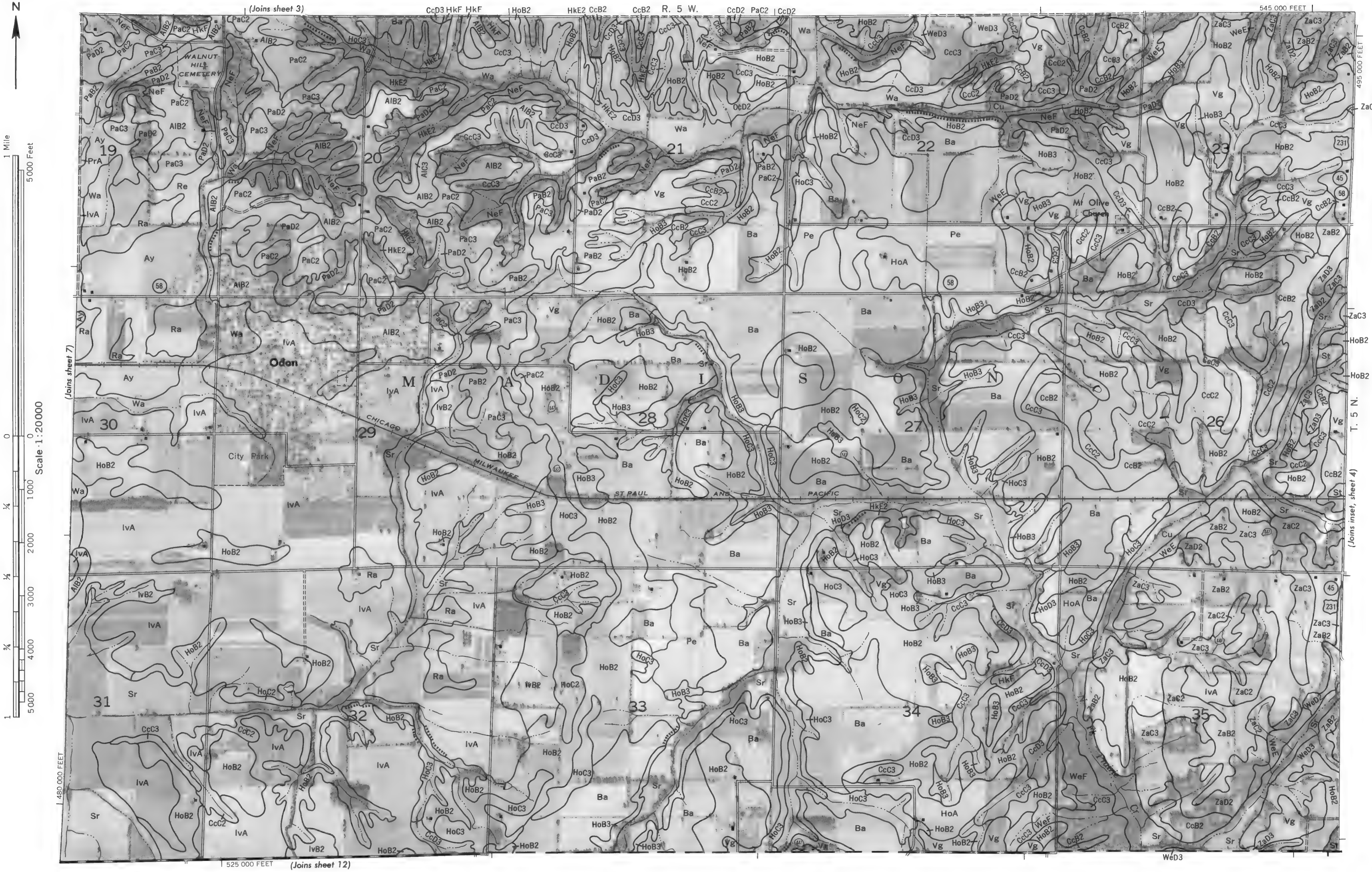
DAVIESS COUNTY, INDIANA NO. 7

8

DAVIESS COUNTY, INDIANA — SHEET NUMBER 8



DAVIESS COUNTY, INDIANA NO. 8

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DAVIESS COUNTY, INDIANA — SHEET NUMBER 9

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DAVIESS COUNTY, INDIANA NO. 9

DAVIESS COUNTY, INDIANA — SHEET NUMBER 10

DAVIESS COUNTY, INDIANA NO. 10

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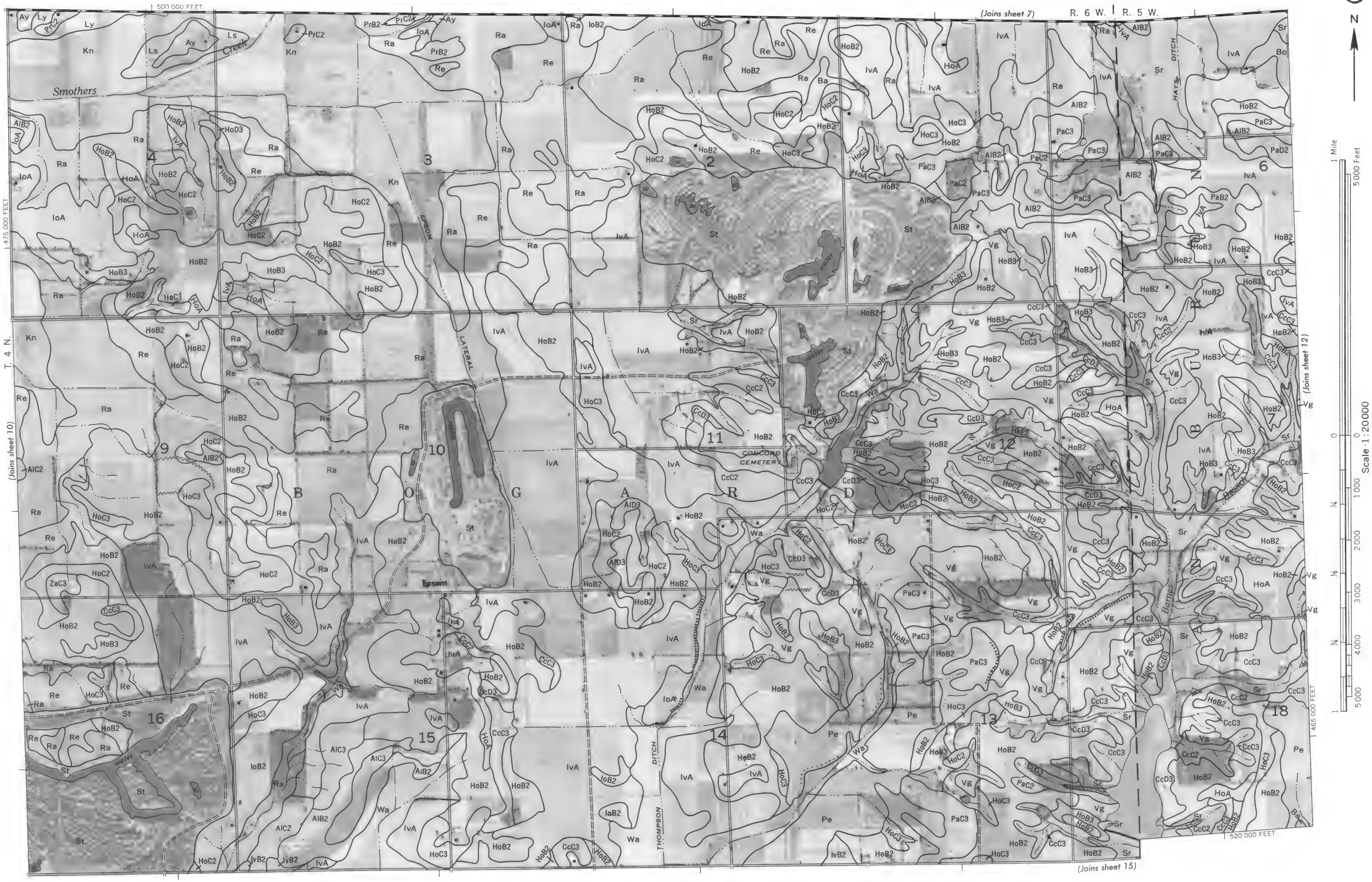
11



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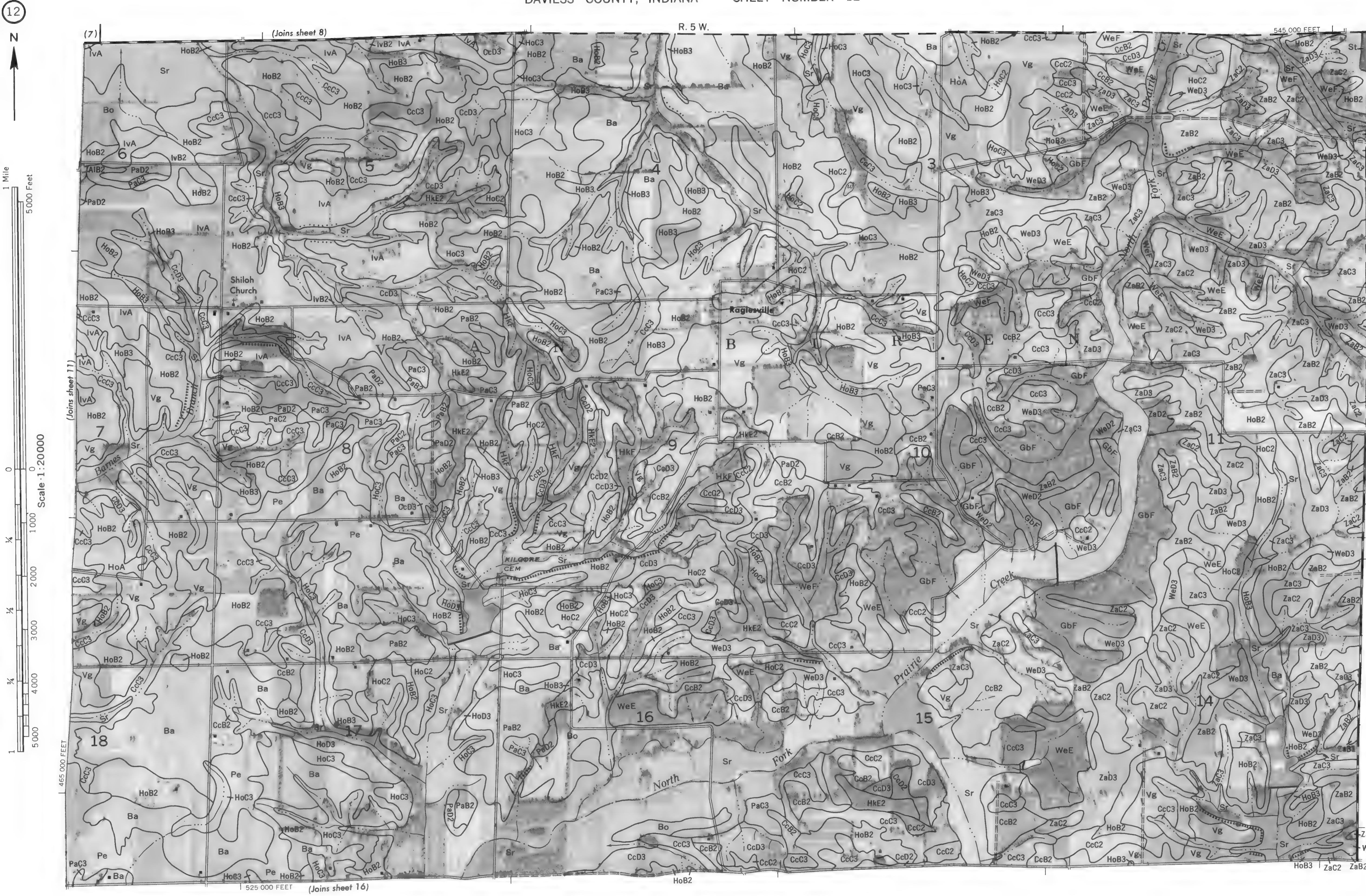
DAVIESS COUNTY, INDIANA NO. 11



DAVIESS COUNTY, INDIANA NO. 12

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13

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DAVIESS COUNTY, INDIANA — SHEET NUMBER 14

DAVIESS COUNTY, INDIANA NO. 14

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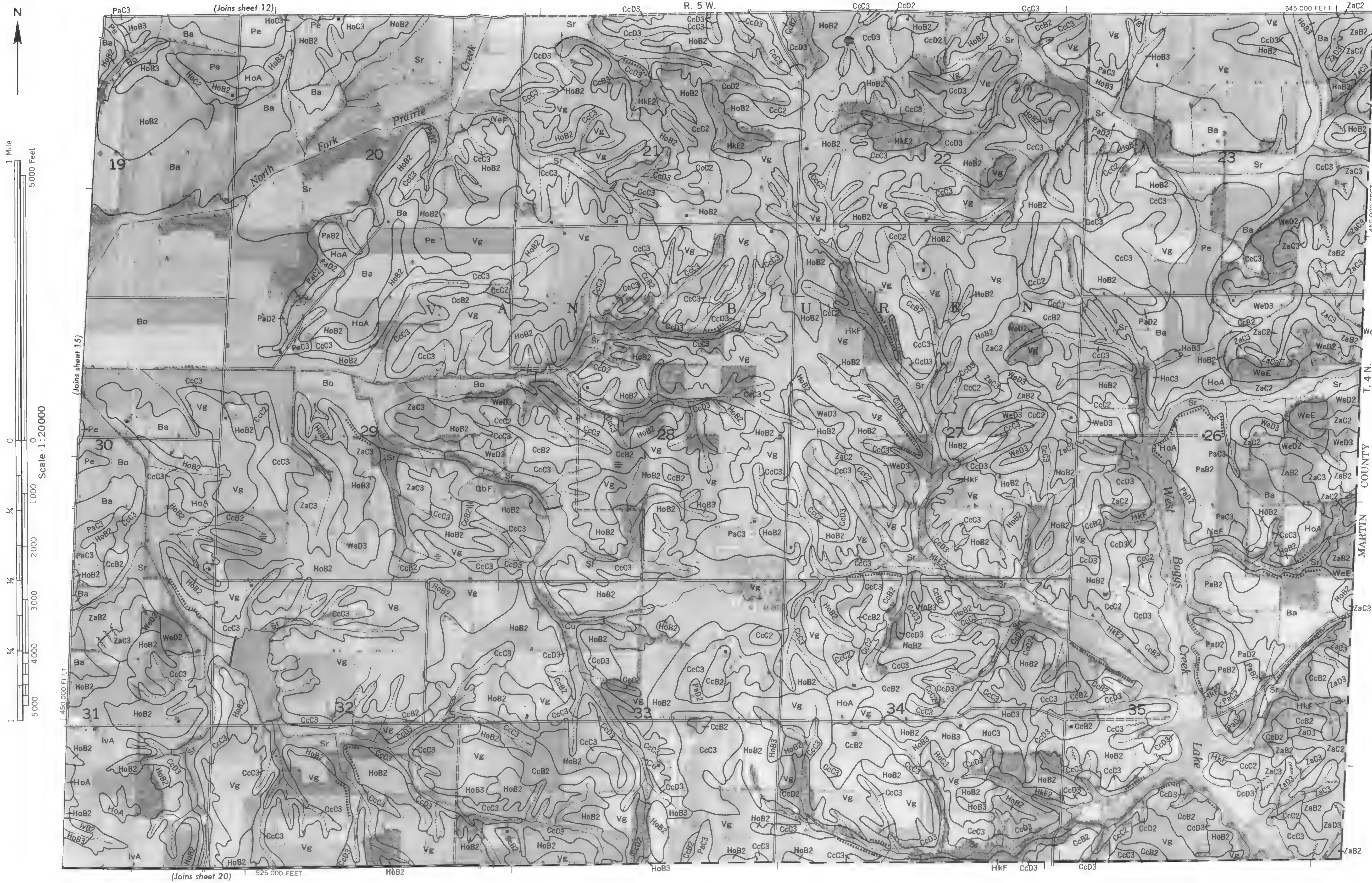
DAVIESS COUNTY, INDIANA NO. 15

DAVIESS COUNTY, INDIANA — SHEET NUMBER 16



DAVIESS COUNTY, INDIANA NO. 16

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DAVIESS COUNTY, INDIANA — SHEET NUMBER 18

DAVIESS COUNTY, INDIANA NO. 18

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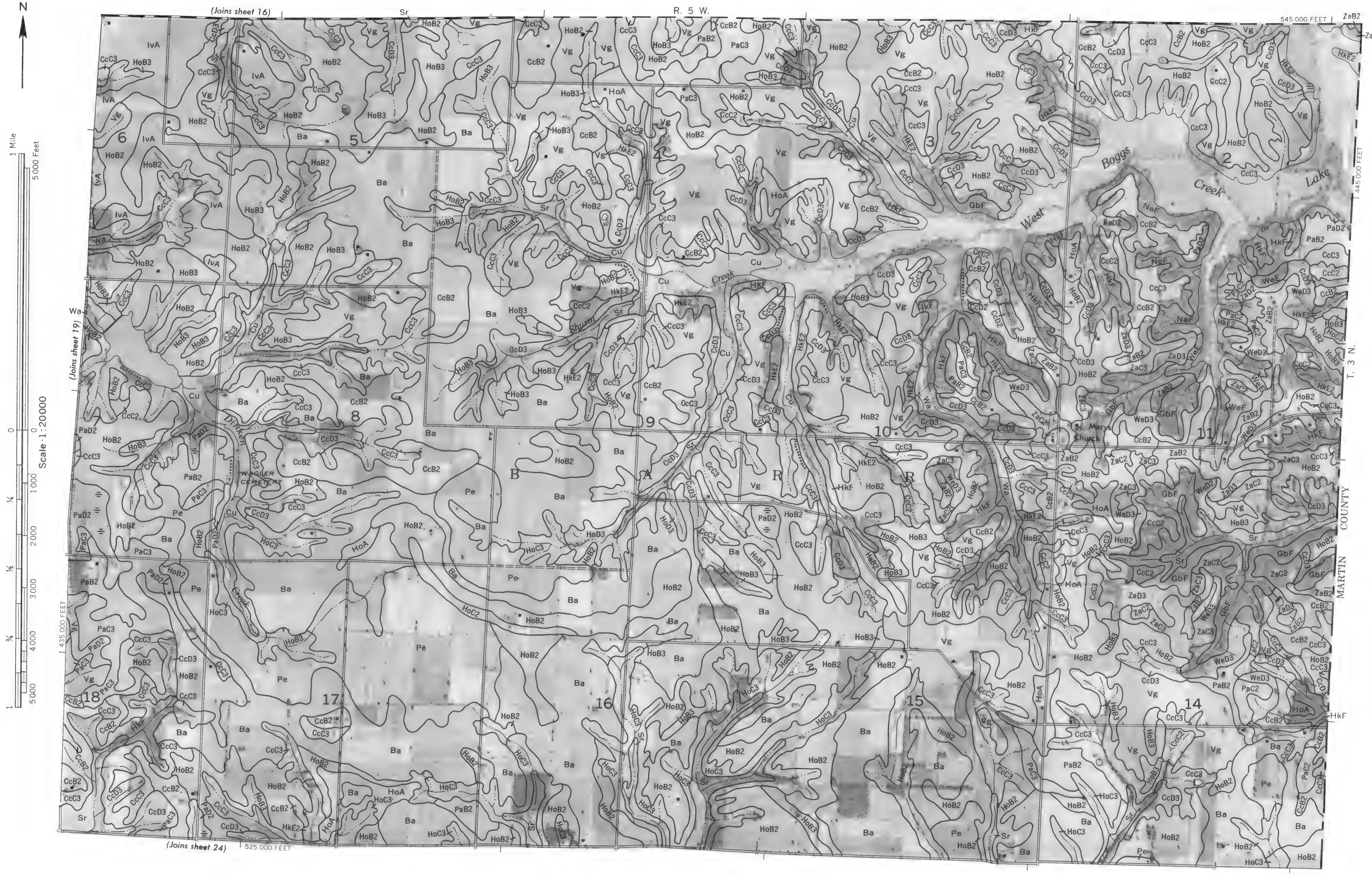
DAVIESS COUNTY, INDIANA NO. 19

DAVIESS COUNTY, INDIANA — SHEET NUMBER 20



DAVIESS COUNTY, INDIANA NO. 20

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DAVIESS COUNTY, INDIANA NO. 21

DAVIESS COUNTY, INDIANA — SHEET NUMBER 22

DAVIESS COUNTY, INDIANA NO. 22

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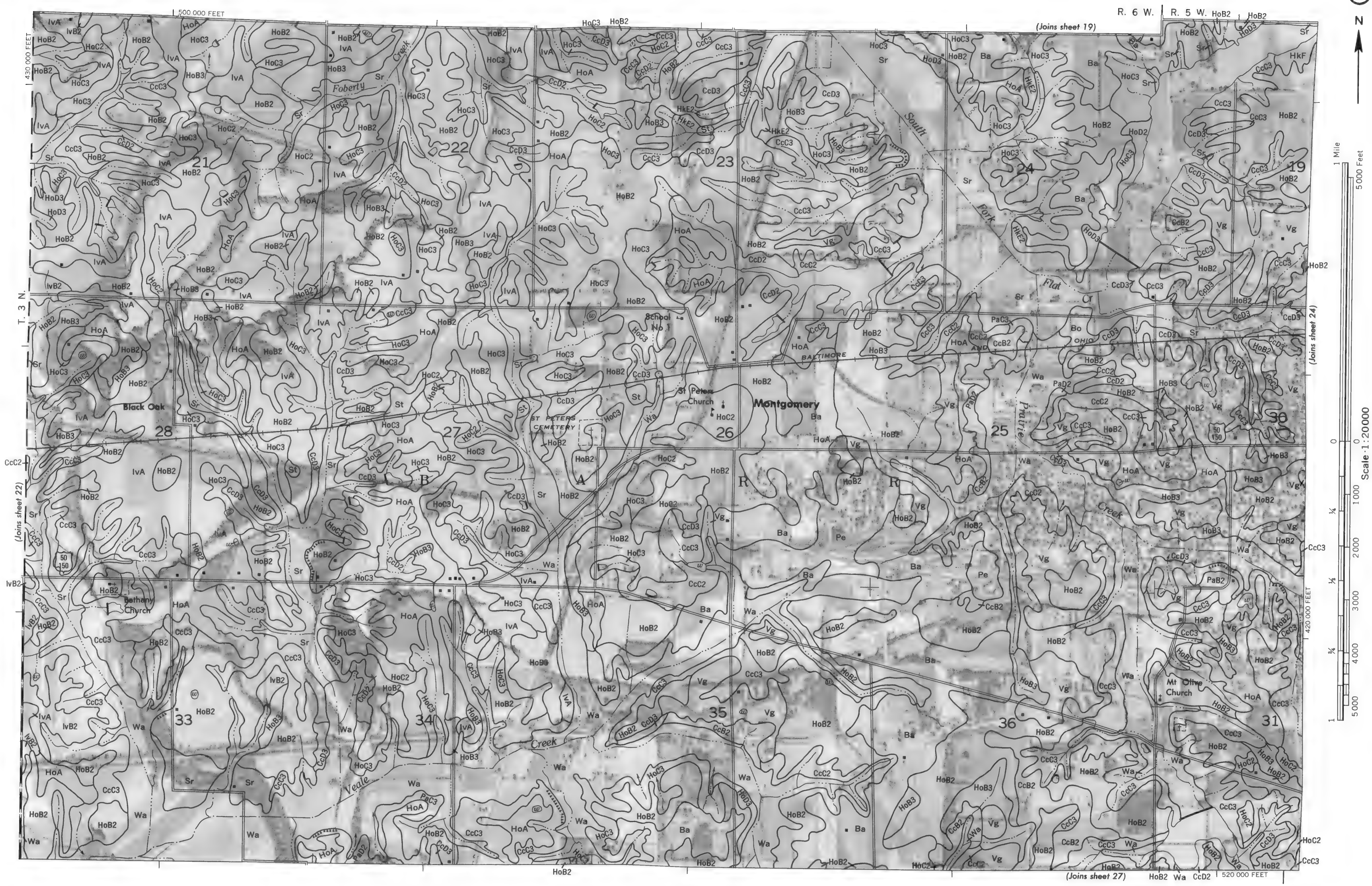

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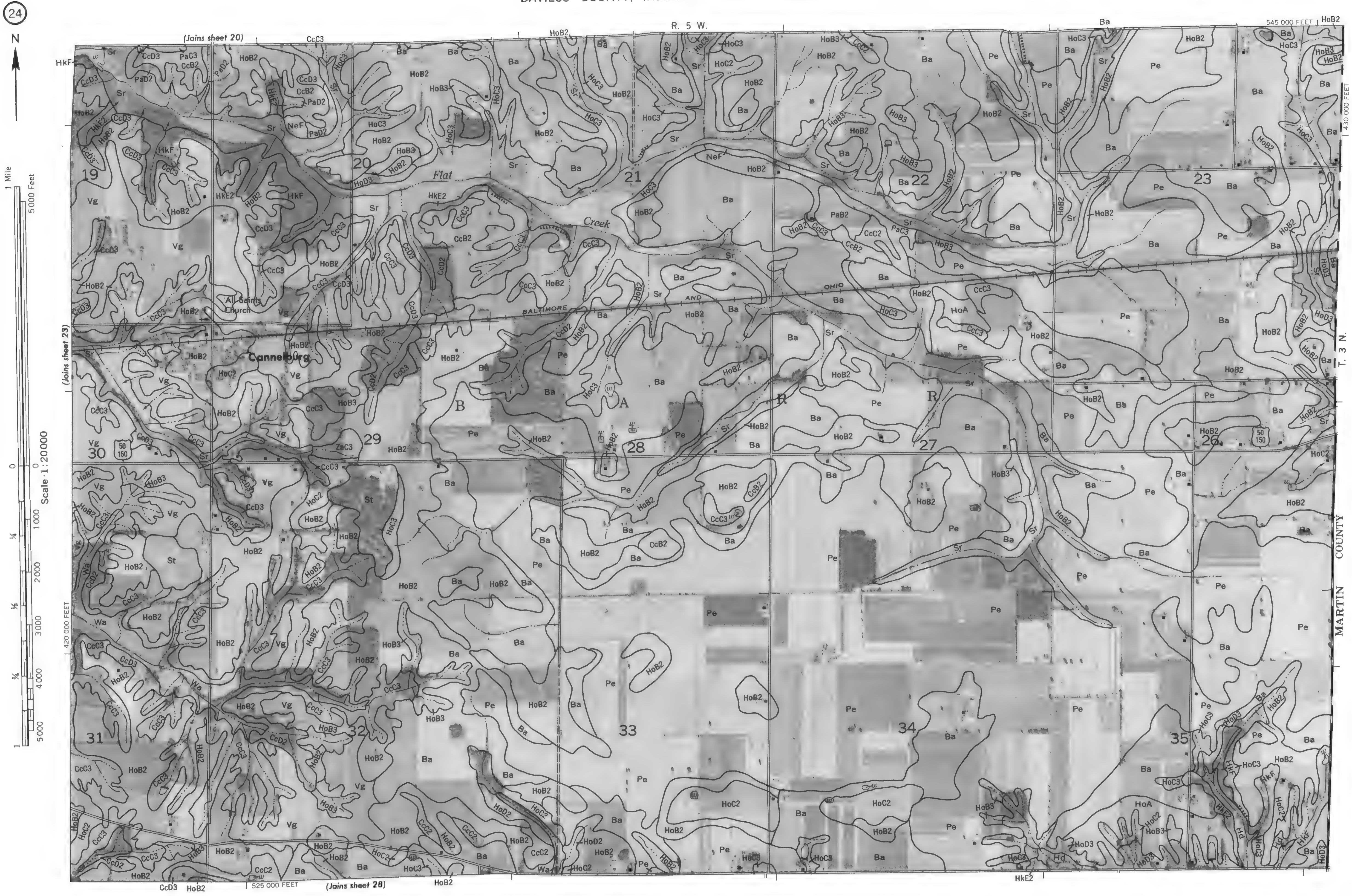
DAVIESS COUNTY, INDIANA NO. 23



DAVIESS COUNTY, INDIANA NO. 24

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25

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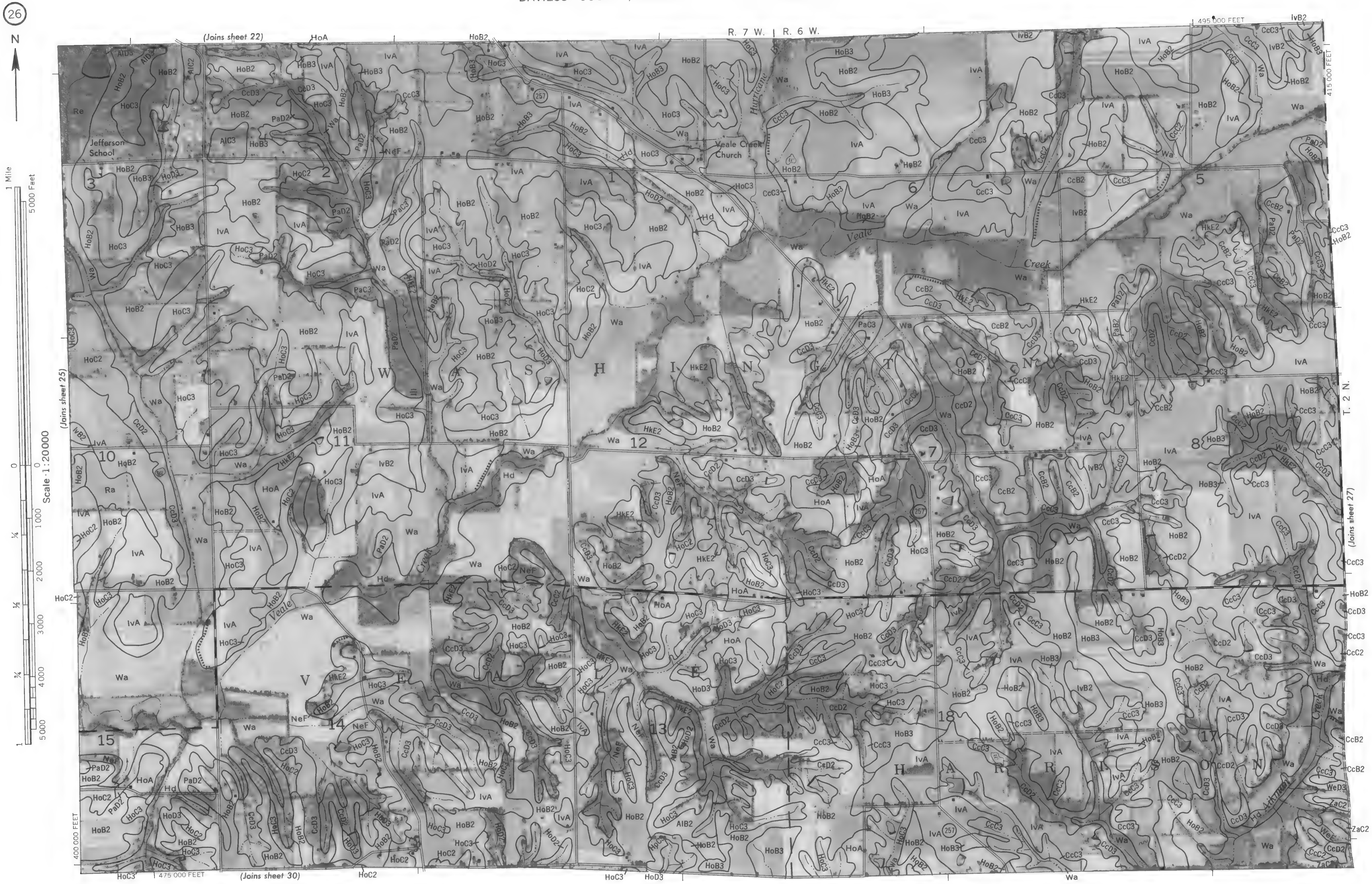
DAVIESS COUNTY, INDIANA — SHEET NUMBER 26



DAVIESS COUNTY, INDIANA NO. 26

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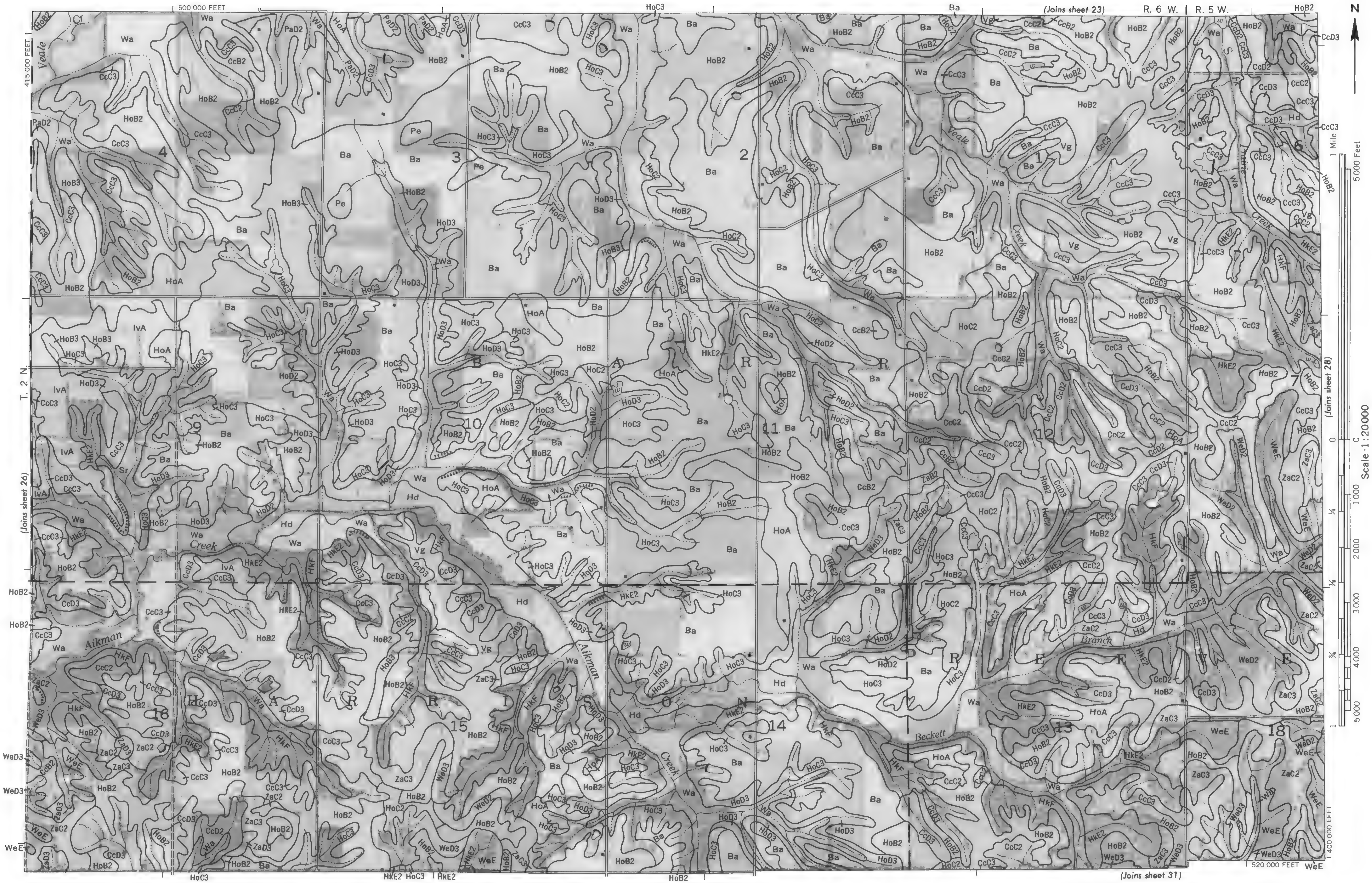

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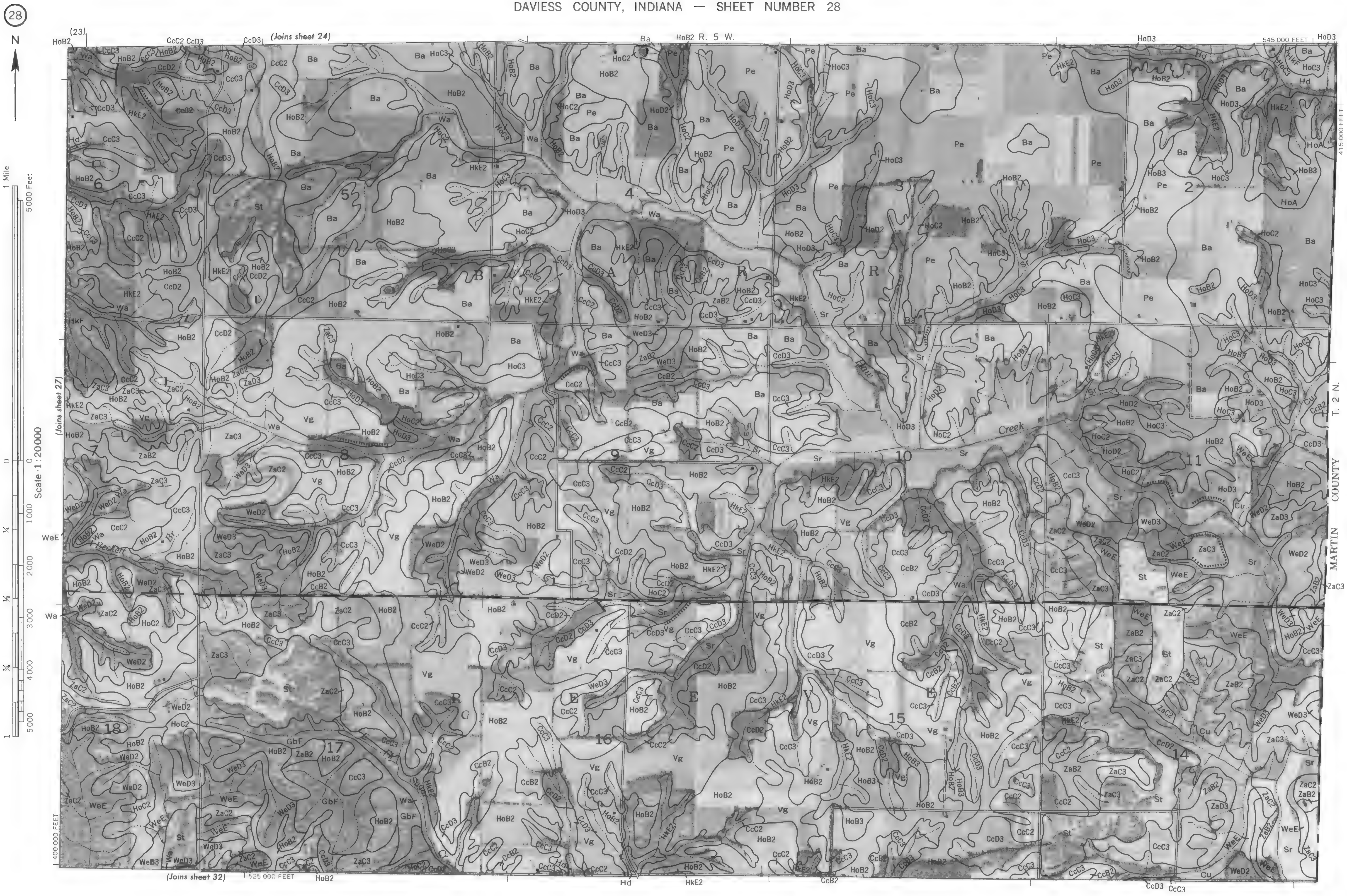
DAVIESS COUNTY, INDIANA NO. 27



DAVIESS COUNTY, INDIANA NO. 28

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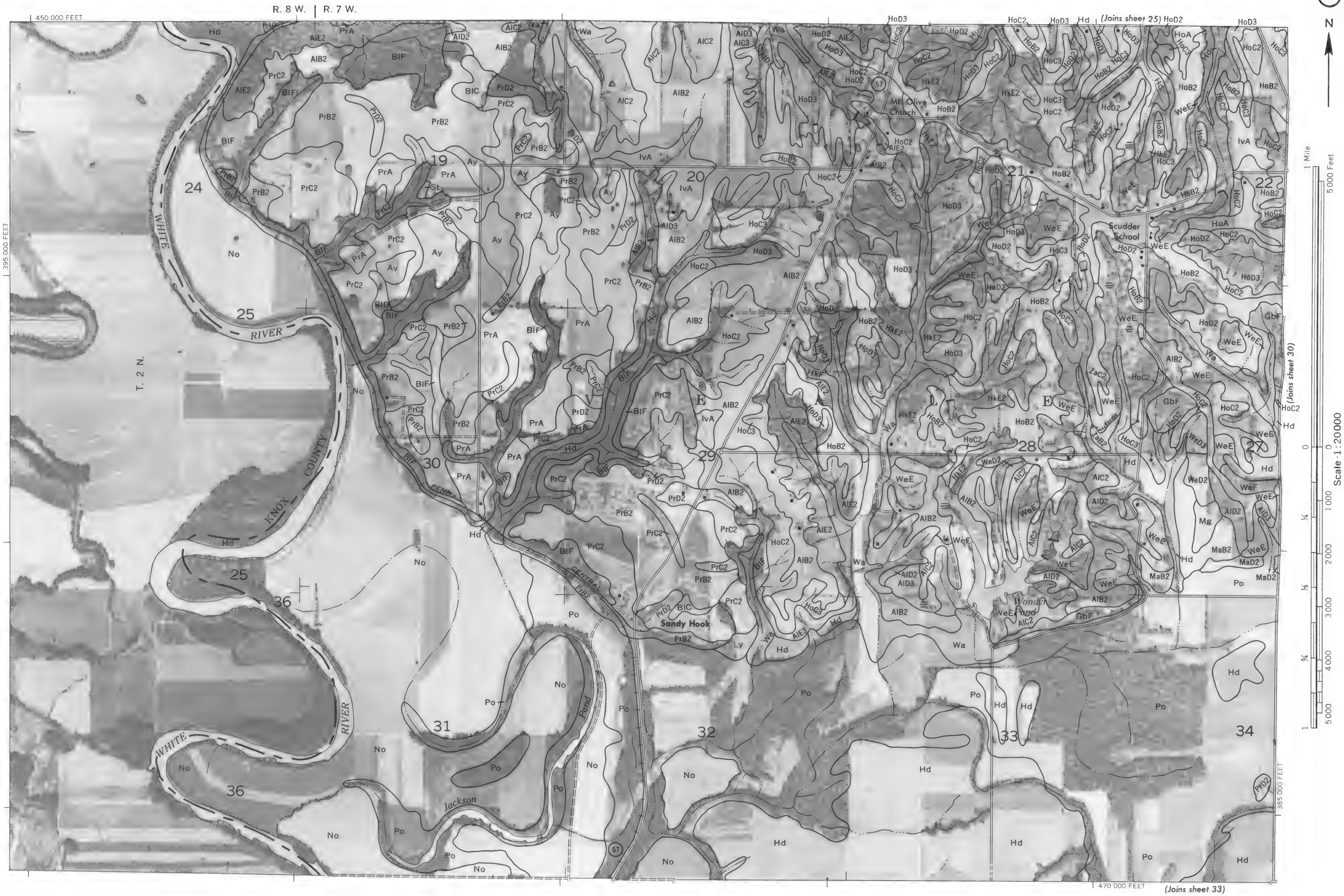

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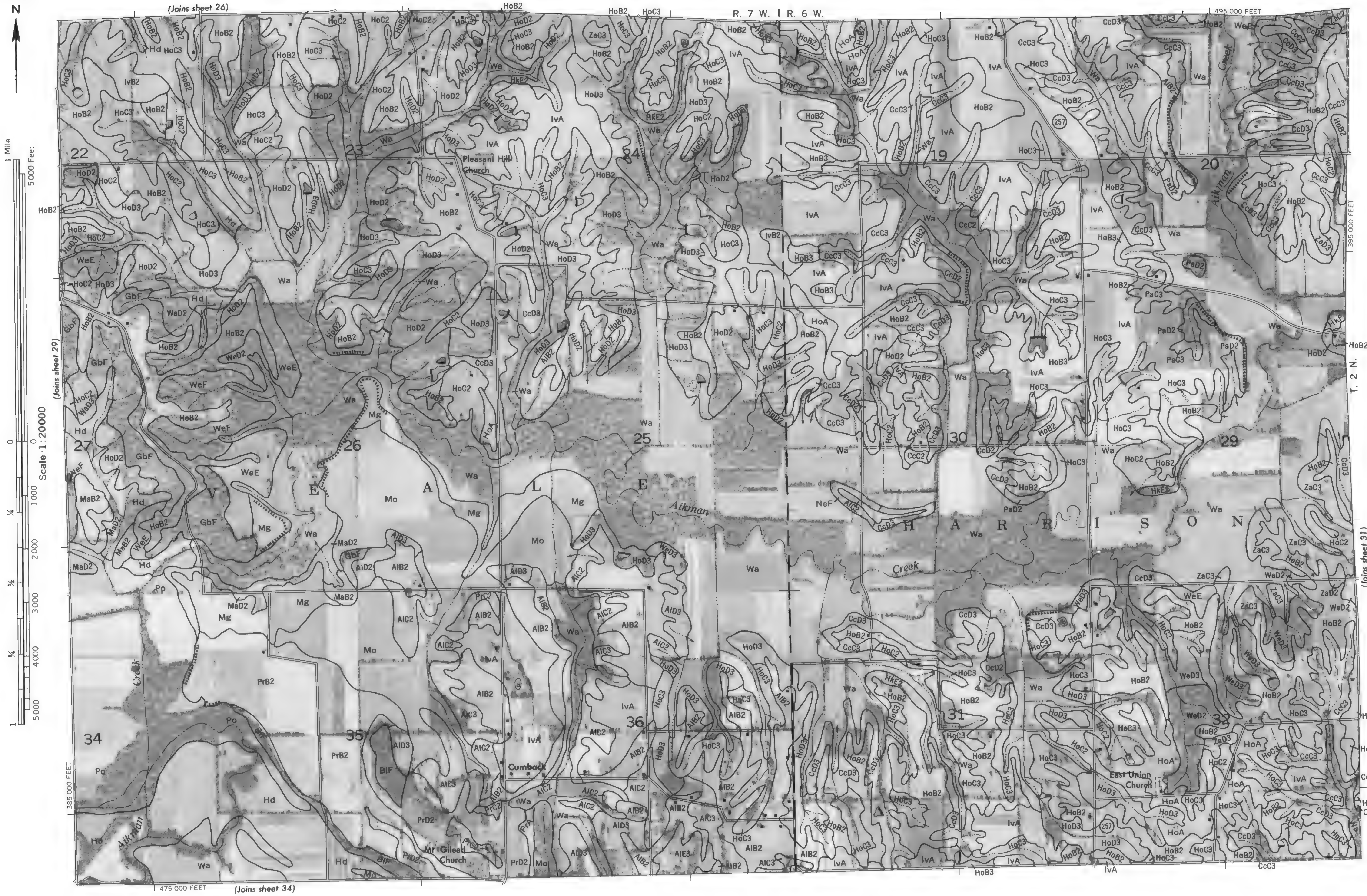

DAVIESS COUNTY, INDIANA NO. 30

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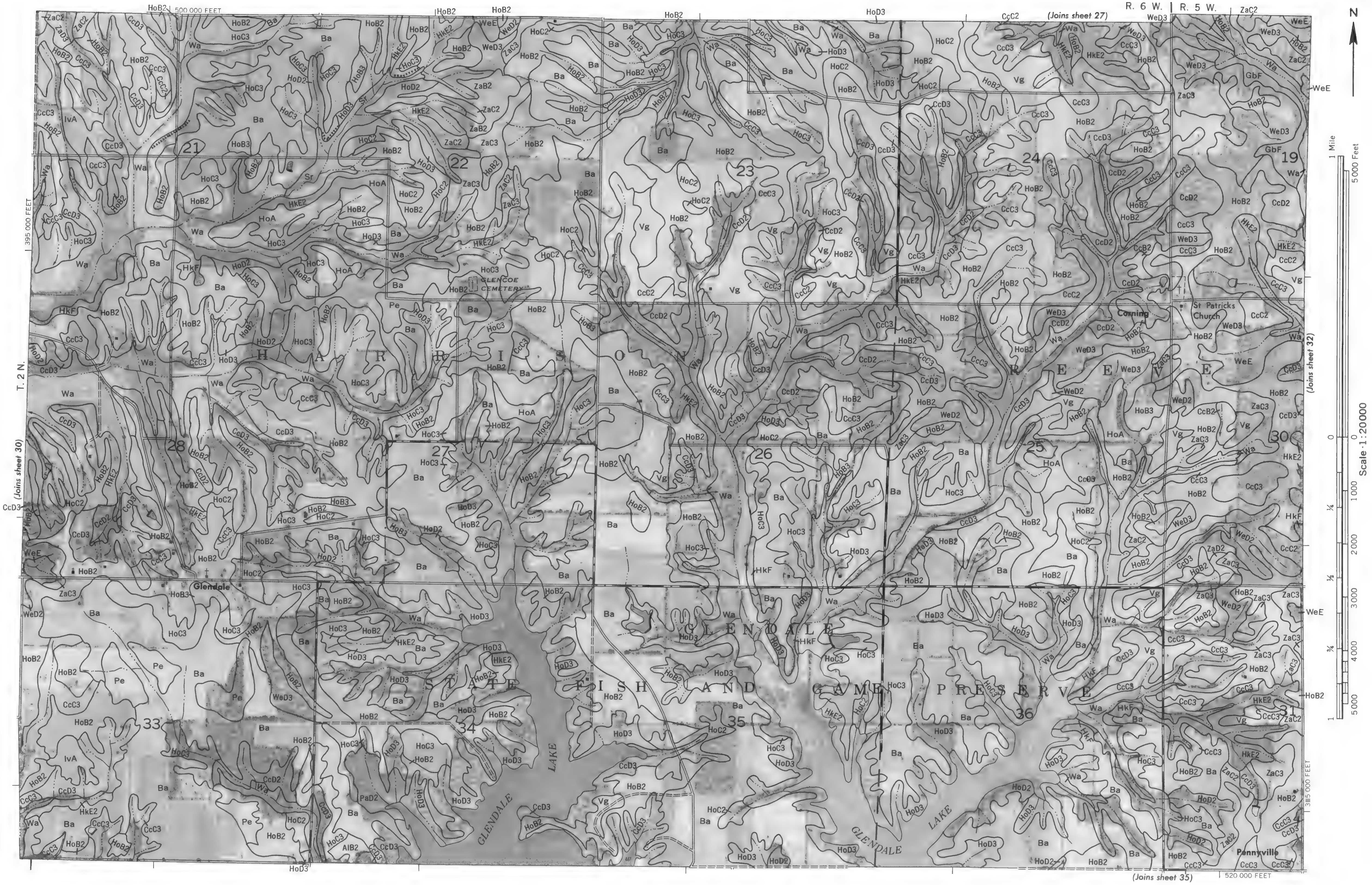

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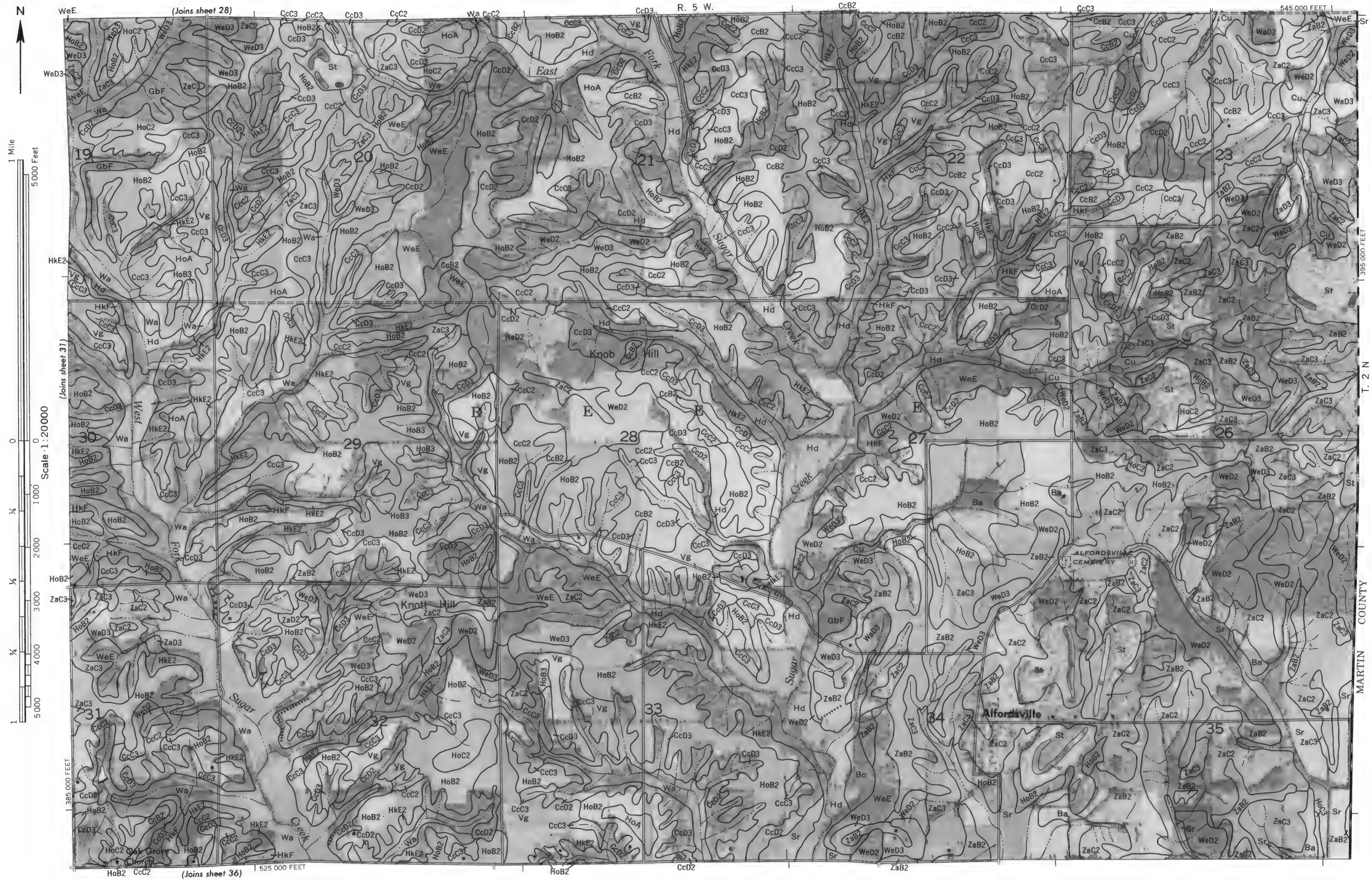
Land division corners are approximately positioned on this map.

DAVIESS COUNTY, INDIANA NO. 31



DAVIESS COUNTY, INDIANA NO. 32

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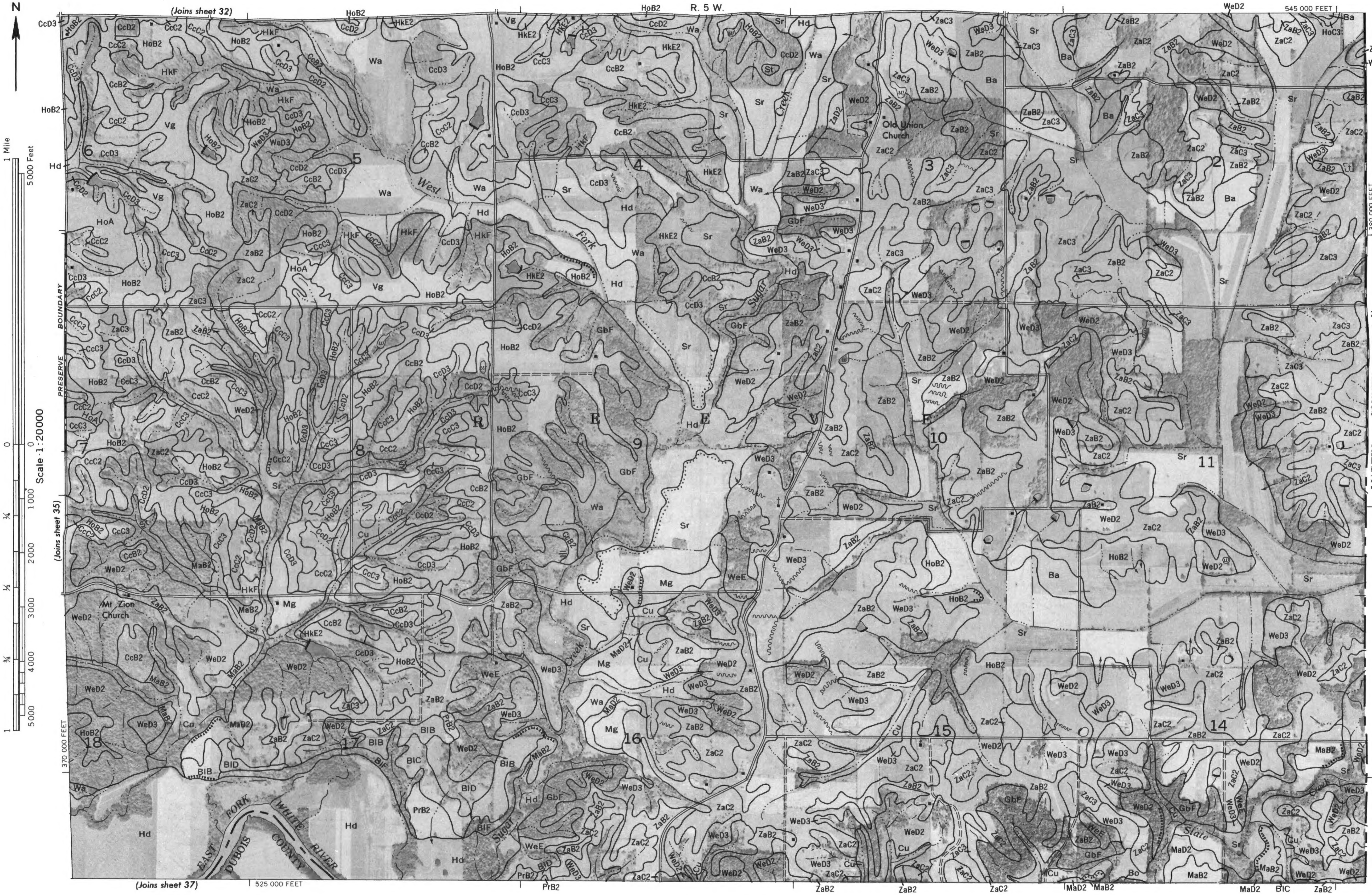
DAVIESS COUNTY, INDIANA — SHEET NUMBER 36



DAVIESS COUNTY, INDIANA NO. 36

Land division corners are approximately positioned on this map.

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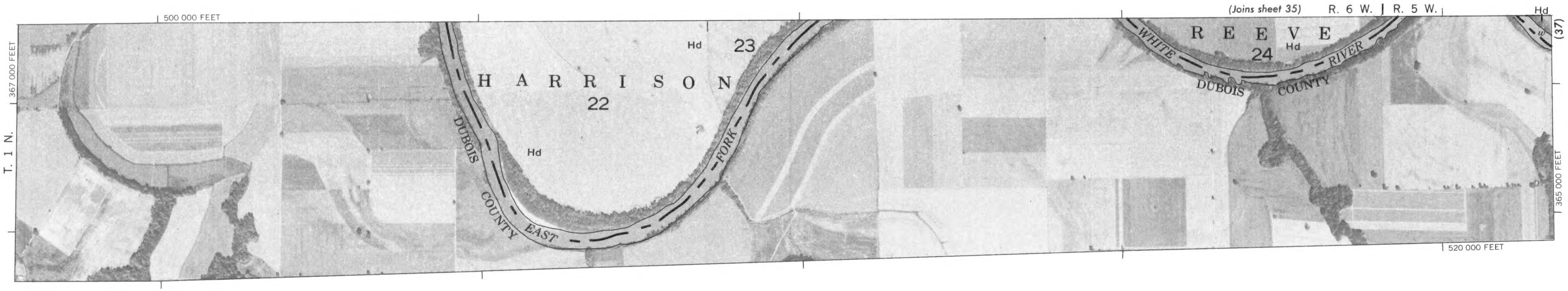
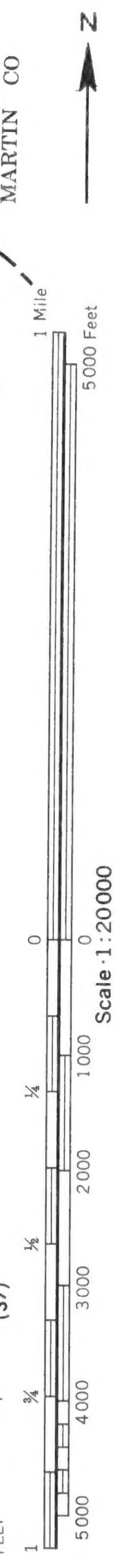
4000 AND 5000-FOOT GRID TICKS



2000 AND 5000-FOOT GRID TICKS



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